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TRUMAN H. NEWBERRY,
Acting Secretary.

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PREFACE.

The UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, editorial comments on current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XVIII.

JANUARY, 1923.

No. 1.

SPECIAL ARTICLES.

THE STUDY OF THE EARTH SCIENCES—ITS PURPOSE AND ITS INTER-RELATIONS WITH MEDICINE.¹

By T. W. VAUGHAN, Geologist, United States Geological Survey.

As a preface to my remarks I wish to call attention to certain fundamental similarities in the processes and objects of science and art and dwell for a moment on the part imagination plays in each. That a considerable number of men have achieved distinction, both as artists and scientific investigators, is worthy of note, and the reasons for this dual success deserve consideration.

Why was Leonardo da Vinci both one of the greatest scientific men and one of the greatest painters the world has known, and why was Lewis Carroll both a distinguished mathematician and one of England's foremost literary artists? To take examples from our midst, Abbott Thayer,² one of the leading American painters, has given the scientific world one of its best contributions toward understanding protective coloration in animals, and William H. Holmes has achieved the highest rank among American anthropologists and is at the same time a water-color artist of distinction.

The man who wrote—

Flower in the crannied wall,
I pluck you out of the crannies;
Hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are root and all, all in all,
I should know what God and man is—

was not merely poet, for he also attained the highest stage of scientific insight and generalization.

¹ An address delivered at the United States Naval Medical School, May 25, 1922. Published by permission of the Director, United States Geological Survey.

² Thayer, Gerald H., *Concealing coloration in the animal kingdom, an exposition of the laws of disguise through color and pattern: Being a summary of Abbott H. Thayer's disclosures.* With an introductory essay by A. H. Thayer. The Macmillan Co., 1918.

Art and scientific research are similar in that they demand the perception of things in their relations one to another and the combination of the essence of such relationship into some new product of the imagination. They both conform to the same principles of composition, as each aims to lead up to some climatic idea, to which all else is contributory. This is equally true of Rafael's Madonnas and Newton's laws of gravitation and his invention of that indispensable tool of science, the calculus.

Art and science may stimulate the mind to wander into the infinite or they may have for their object making life easier, more comfortable, and more agreeable. Both aim to bring man into more harmonious relations with the universe of which he is a part, on the one hand, by leading himself away from himself to contemplate the immensities among which personality dwindled to nothingness and, on the other hand, to surround him by objects agreeable to look at, to place at his disposal conveniences, or to overcome obstacles that threaten or impair his happiness. Geology does all of these things, and it is about these that I wish to speak to you.

Albert Groll is an artist of whose pictures I am particularly fond. He paints the great arid West. I remember once standing before one of his pictures with W. H. Holmes who remarked, "A bird could fly through that sky." Groll had caught and fixed on his canvas the beauty of the transparent blue of the sky of our western desert lands and the mind of the beholder is stimulated to fly through the sky to the starry regions beyond, and perhaps there he may learn something of the origin of our diminutive solar system and our still tinier earth.

Geology begins with an attempt to explain the origin of the solar system, the sun, its planets, and their moons. For a long time it seemed that a valid explanation of the origin of these bodies had been found in the Kant-Laplace nebula hypothesis, according to which the whole solar system was derived from a large gaseous nebula which was rotating, and as it cooled the planets were thrown off in successive generations, the outer being the older, and from the planets the moons were derived. As knowledge advanced it was discovered that there were features of the solar system discordant with this hypothesis, and Professor Chamberlin invented his planitesmal hypothesis. According to the planitesmal hypothesis the planets were formed from a spiral nebula, composed of "a streaming knotty pair of arms of nebulous matter shot out from the sun and curved into spiral appendages by the joint pull of the sun and a passing star."³ The knots in the spirals served as collecting centers and they, because of their greater mass and consequently greater power of attraction,

³ Chamberlin, T. C., *Origin of the Earth*, p. 130, 1916.

drew to themselves the small bodies of matter near them and gradually grew to be planets. This is a majestic hypothesis, rivaling in grandeur that of Kant and Laplace, but critical examination of it appears to reveal defects in it, and at present there is no hypothesis to which all geologists give unreserved assent. It might be thought that we are now bankrupt in thought regarding the origin of the earth, but there is hope, for astronomy is making rapid progress, and knowledge of the relations of our solar system to other heavenly bodies has during recent years been greatly extended.

This hope comes from the investigation of giant and dwarf stars. The following are two quotations from an article on "Giant suns" published three years ago by H. H. Turner.*

Eddington has in fact given us a rough attempt at tracing the history of a star of given mass. By way of illustration let us consider our own sun. He is now a "dwarf star," on the descending leg of the ladder, of spectral type G,[†] and with a surface temperature of about 5,000° C., and an absolute magnitude 5.1. Looking back into the past he was at one time much hotter and of type F, and probably never rose much higher than this on the ladder. Before that his history lay on the ascending leg, and there was a time when his spectral type was just as at present, but his absolute magnitude was near zero, five magnitudes greater than at present. This means that the total light was 100 times greater than now, and since the surface was in a similar radiative state it must have been 100 times more extensive. The diameter of the sun was therefore 10 times the present diameter—10,000,000 miles instead of 1,000,000. Where our little earth may have been at that time we can scarcely conjecture, but supposing for a moment that we had been able to regard the sun in our present conditions he would have taken nearly an hour to rise instead of a few minutes; and when risen his disk would be 10 times as great in all directions—a "giant" sun indeed! And yet this magnification of 10 to 1 is only modest compared with the extreme possibilities.

One of the most remarkable suggestions of Professor Eddington's work gives a reason for the close resemblance in mass of the stars. There is a certain mass for which the radiation pressure pressing outward nearly balances the force of gravitation pulling inward, and it is clear that for stars as large as or larger than this a break-up sooner or later is to be expected. This assigns very obviously the upper limit to the masses—we can easily see why there are no stars larger than a certain limit. But how about the lower

*Turner, H. H., *Giant suns: Weekly evening meeting of Roy. Instit. Grt. Brit. Proc.*, for Jan. 31, 1919; republished in *Smithsonian Instit. Ann. Rept. for 1920*, pp. 173-182, 1922.

†The following table of spectrum-types and temperatures of stars is from an address, "Relations between the spectra and characteristics of stars," by H. N. Russell: *Amer. Astron. Soc. Pub.*, vol. 6, p. 25, 1918.

Spectrum.	Temperature.	Spectrum.	Temperature.	Spectrum.	Temperature.	Spectrum.	Temperature.
	°C.		°C.		°C.		°C.
B 0.....	20,000	A 5.....	9,000	G 0.....	5,000	K 5.....	3,200
B 5.....	14,000	F 0.....	7,500	G 5.....	4,500	M.....	3,100
A 0.....	11,000	F 5.....	6,000	K 0.....	4,200	N.....	2,300

limit? Are there no stars very much smaller than this? Certainly there are. We are living on one of them. Our earth is smaller by some thousands of times; but then it is not a star in the full sense, for it is not shining with its own light. If it did ever so shine, the light must have been feeble at best and have lasted only for a very short time. There may, in fact, be many small stars, but we do not see them and accordingly have not reckoned them in saying that the masses of the stars are closely similar.

It should be remarked in passing that these quotations do not contradict either the nebula or planitesmal hypothesis.

Present opinion regarding the sun may be temporarily satisfying, but the earth remains a puzzle. However, there seems to be reason to hope that astronomers from their investigations of stellar evolution may invent a more acceptable hypothesis than any yet proposed.

Certain things about the earth are known with much precision. We know its shape, size, and density and something of its rigidity. The mean density of the surface rocks is between 2.6 and 2.8, and the mean density of the whole mass of the earth is between 5.5 and 5.6 times that of water. Its rigidity is as great as or greater than that of steel.⁶

After the earth had formed as a body probably of about the same size and physical constitution as at present a series of changes followed and have continued down to the present day. Parts of the earth's surface rose above the waters, while other parts remained below. Eroding agencies attacked those parts above ocean level and were perpetually trying to pull down the heights and fill up the hollows. But the degrading forces were ever baffled in the completion of the task that confronted them, because parts of the so-called earth's crust were always being pushed up somewhere and the wearing down had to be done all over again. In places great masses of molten matter were shoved under or into other rocks and in some places were and in other places were not accompanied by volcanic activity. Geology studies the forces that produced these effects and tries to ascertain the succession of events recorded in them.

The material taken from the heights and deposited in the hollows composes the sedimentary rocks. These may be dated with reference to one another by the order in which one lot of sediment is piled on the primordial earth floor or on some other rock of later age. The earlier rock contains no traces of organisms but after a time life appeared on earth and it has left its vestiges from early, but not earliest, earthly time. Remains of organisms make it possible to follow the development of living things, with their continuous modifications, their divergence from parent stocks into new stocks, steadily multiplying in variety of form and complexity of organiza-

⁶ Lambert, W. D., *The internal constitution of the earth*: Wash. Acad. Sci. Jour., vol. 10, pp. 122-143, 1920.

tion, reaching from the lowly, primitive one-celled animals and plants to man and the flower-bearing vegetation of the present day.

This evolution of organisms was orderly, and each division of geologic time was characterized by its own peculiar fauna and flora. Knowledge of the organisms of the past is now considerable, and by means of this knowledge contemporaneity of strata in different parts of the world may be recognized. Fossils are the chronometers of geologists, for it is by means of them that the contemporaneity or noncontemporaneity of geologic events in distant parts of the world become known.

Regarding the purpose of the study of sedimentary rocks, I venture to quote part of a paragraph of a little paper by myself:¹

"It tries to reconstruct the geography of the earth for each of the successive periods of the earth's history since sedimentation began; to ascertain the boundaries of land and sea; to trace the rises and the sinkings of the continents, the growth and the destruction of mountains, and the waxings and the wanings of the seas; to reconstruct the climates and the physical features of the lands of the past and to populate their surfaces with the life that then existed; to bring before our vision the seas of the ages gone by, so that we shall see what was happening in them and know the old oceans, with their currents, their temperatures, their depths, the composition of their waters, and the organisms that inhabited them. It tries to bring back the reality of what was long ago and follow the changes that have taken place on earth."

For the earth, geology is the great science of history. Its story reaches back over hundreds of millions of years and all modern history has its roots in this much longer history. It is therefore appropriate that Merriam² should emphasize the earth sciences as a background of human history and that Wells's "Outlines of History" should begin with a review of earth history prior to the advent of man and his attainment of civilization. It is only the geologic record that reveals the steady rise in intelligence among mammals, the rise of the anthropoid stock, and the slow stages, each a little higher than the preceding, whereby early anthropoid man gradually ascended higher and higher in the scale of intellectuality and spirituality and ultimately became the man of to-day.

Although it is a part of the province of geology to try to discern the beginnings of the earth and to trace that history, or as much of it as is possible, through the past ages and up to the present time, other matters also belong in its domain. It appears that many are not aware of the intimate relation geology bears to the everyday life

¹ Vaughan, T. W., *Researches on sedimentation*: Geol. Soc. Amer. Bull., vol. 31, pp. 401-410, 1920.

² Merriam, J. C., *Earth sciences as the background of history*: Geol. Soc. Amer. Bull., vol. 31, pp. 233-246, 1920. Also *Scientific Monthly*, January, 1921, pp. 5-17.

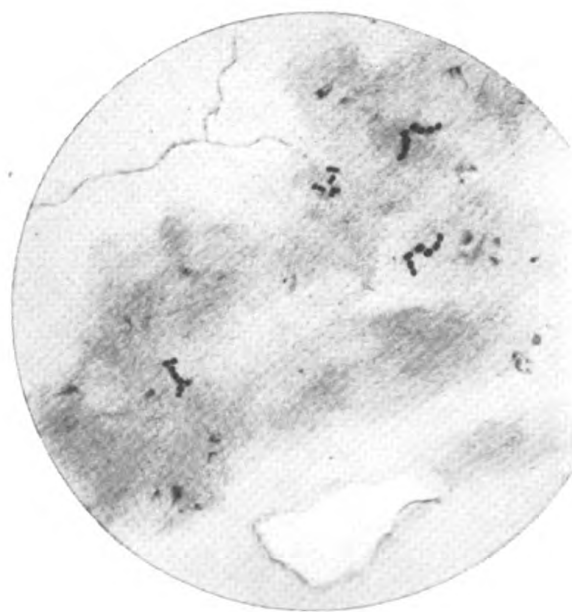
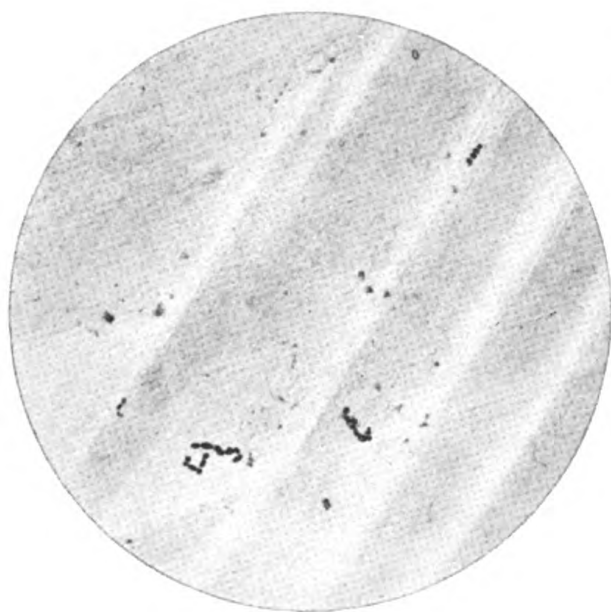
of man. I should like to mention a few of the common things of life derived through the application of geology in some form. How many, when they dress in the morning, think of the gold mines whence the gold of their shirt buttons comes, or of the iron mines that supplied the iron for the nails in their shoes and for their pocketknives? The copper of the electric light and telephone wires comes from copper mines; the silver in knives, forks, and spoons comes from silver mines; the clay used in making plates, cups, and saucers is taken from clay pits; the coal that furnishes the heat for cooking and for heating our houses is obtained from coal mines; the panes of glass in the windows and the glasses for drinking purposes are made of melted sand. Our houses are built of burnt clay or stone; we walk on sidewalks of cement or brick, and the streets are paved with asphalt, brick, or cobblestones. The power used in motor cars is derived from a petroleum product. Geologic products are used in every aspect of our lives. The list I have given might be greatly increased. How many of the materials used in medicine and surgery are geologic products? Some medical man might amuse himself by compiling such a list from a treatise on *materia medica*, and he might also make a list of the materials used in the construction and outfitting of hospitals and in the manufacture of surgical instruments.

Two sciences furnish the raw materials on which the life of modern man is based—they are geology and agriculture. Of these two sciences, looked at in one way, geology is the more fundamental, because plants have their roots in the earth and their tops in the air—both media, which considered in their historical aspects, belong in the domain of geology. But the soil, its composition, and its relations to the rocks from which it is derived, is particularly a geologic subject. There is no science that enters more intimately into and more completely permeates the life of man than geology.

Since geology is not a science within itself but is the result of the application of all science to understanding the earth and making its products available for human use, it derives valuable information from all other sciences and it in turn can supply information of value or interest to all other sciences. I wish now to point out certain contacts between medical research and geologic research, and I will first briefly discuss the relation between geology and bacteriology.

Dr. C. D. Walcott in his studies of pre-Cambrian sedimentary rocks, the oldest known sedimentary geologic formations, found that the rocks exposed in central Montana are largely composed of the remains of algae. Filaments that occur in the calcareous masses formed by the algae are similar to those of modern blue-green algae of the water-biscuit kind. In these rocks he also recognized organic remains, apparently of bacteria belonging to the coccus group.* (See

* Walcott, C. D., *Discovery of Algonkian bacteria*: Nat. Acad. Sci. Proc., vol. 1, pp. 256, 257, figs. 2, 3, 1915.



FIGURES 1 AND 2.—A MICROCOCCUS OF AN UNDETERMINED SPECIES RECOVERED AS FOSSIL REMAINS FROM SEDIMENTARY ROCKS. MAGNIFIED ABOUT 1,000 DIAMETERS. AVERAGE SIZE OF THE MICROCOCCI 0.95 TO 1.3 MICRONS IN DIAMETER. OBTAINED FROM LOCALITY 401 b. ALGONKIAN: GALLATIN FORMATION: NORTH SIDE OF EAST GALLATIN RIVER, 5 MILES EAST OF LOGAN, GALLATIN COUNTY, MONT. (AFTER WALCOTT). DOCTOR WALCOTT KINDLY FURNISHED THE PHOTOGRAPHS FROM WHICH THESE FIGURES WERE MADE.

Figs. 1 and 2.) Because of their resemblance to present-day micrococci, it seems reasonable to interpret these objects as micrococci, and, therefore, it seems probable that bacteria have been recognized in the oldest sedimentary rocks. In fact, it is possible that bacteria already in those early times were cooperating agencies in the formation of some limestones.

I will now shift from these very old rocks to young limestone and limestone now forming in the Bahamas and Florida. Nearly all of the land areas of the Bahamas and a considerable part of the land area in southern peninsular Florida and many of the Florida Keys are composed of a peculiar limestone which has been confused with coral-rock.

A close inspection of a piece of this rock,¹⁰ even with the naked eye, reveals that it is composed of minute balls and ovoid or ellipsoid bodies, which range from 0.2 to about 1 millimeter in diameter, set into a cementing groundmass. Because the ball-like bodies composing the rock give it an appearance similar to fish roe, it is known as oolite, which means egg rock. These bodies are composed of concentric coats, and it is obvious that they were formed by some process that caused outer coats to be successively laid down on the inner ones. This rock contains more than 99 per cent calcium carbonate, and the egglike granules originated in the sea. How was the carbonate of lime taken out of the sea?

Recent investigations have very clearly shown that there is in the shallow waters of the tropical and subtropical parts of the ocean as much carbonate of lime in solution as it is possible for the water to hold—in other words, the water is saturated with carbonate of lime. It is therefore clear that any agency that will reduce the capacity of such water already saturated to hold calcium carbonate in solution will cause that substance to be precipitated. The principal solvent of calcium carbonate in sea water is carbon dioxide, and the reduction of the amount of it in the sea water will produce precipitation. Raising the temperature of the water, whether naturally or artificially, reduces its capacity to hold CO_2 , and agitation, if there is too little CO_2 in the air will hasten the process. Evaporation, leading to a greater concentration of salts in the water, will also cause precipitation of calcium carbonate.

Besides the inorganic agencies mentioned, there are organic agencies that cause the precipitation of calcium carbonate in the sea. It has been known for a long time that the addition of a strong alkali, such as ammonia, to sea water will produce precipitation of carbonate of lime. There are several kinds of bacteria that cause the

¹⁰ Vaughan, T. W., Corals and the formation of coral reefs: Smithsonian Instit. Ann. Rept. for 1917, pp. 189-276, 37 pls., 1919. The statement above given is taken with only slight modifications from the paper cited.

formation of ammonia in the ocean. One of these kinds is known as denitrifying bacteria, because they break up nitrate salts in the sea, converting nitrates into nitrites and these into ammonia, and they are to a considerable degree responsible for the limited development of green plants in tropical seas, as they rob such plants of an important part of their food. G. H. Drew found as many as 160,000,000 of these bacteria in 1 cubic centimeter of mud off the west side of Andros Island, Bahamas, opposite the mouth of South Bight. A figure (fig. 3 reproduced from one by Kellerman) is here given of this very minute organism, which is known as *Pseudomonas calcis* (Drew) Kellerman.¹¹ Any other bacteria that will evolve ammonia,

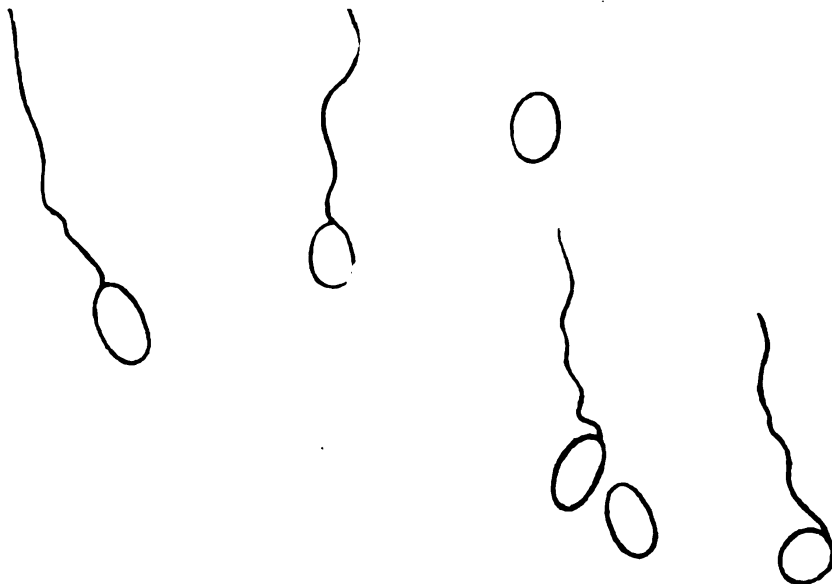
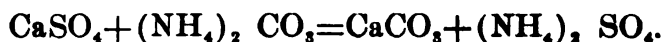


FIGURE 3.—*Pseudomonas calcis* (Drew) Kellerman. Size of organisms 1.1 by 1.5 to 3 microns (after Kellerman).

particularly if there is CO_2 present in addition to ammonia, will also cause the precipitation of calcium carbonate according to the equation



Green plants, because they take CO_2 from the water, are also agents that may cause the precipitation of CaCO_3 . In such areas as the shoal waters on the lee sides of the islands and in the lagoons in the Bahamas, where all the agencies mentioned are cooperating to bring about the precipitation of calcium carbonate, it is not at present possible to estimate how much of the effect is attributable to each.

The material when first precipitated is very finely divided, and may form very minute needles or small balls of the mineral known as aragonite. Oolite grains of calcium carbonate may be produced

¹¹ Kellerman, Karl F., and Smith, N. R., Bacterial precipitation of calcium carbonate: Washington Acad. Sci. Jour., vol. 4, pp. 400-402, 1 fig., 1914.

artificially, either by means of cultures of bacteria that evolve ammonia or by adding ammonia to sea water. But as the very fine concentric banding of the Bahaman oolite grains has not yet been reproduced in the laboratory, there are still some features of these grains that need more investigation.

Bacteria are among the important geologic agents and enough work has been done on them as such agents to supply sufficient material for a large volume. As a result of his investigations of iron-depositing bacteria¹² "Harder concludes that, according to present knowledge, there are three principal groups of iron-depositing bacteria—(1) those that precipitate ferric hydroxide from solutions of ferrous bicarbonate, using the carbon dioxide set free and the available energy in their life processes; (2) those that do not require ferrous bicarbonate for their vital processes but that cause the deposition of ferric hydroxide when either inorganic or organic iron salts are present; (3) those that attack iron salts of organic acids, using the organic acid radicle as food and leaving ferric hydroxide, or basic ferric salts that gradually change to ferric hydroxide."

These are a sufficient number of illustrations to show how geology and medicine have a communal interest in bacteriology. I will now point out how they also have a communal interest in physiology.

As long ago as 1858¹³ Rainey in a remarkable book entitled, "On the mode of formation of shells of animals, of bone, and of several other structures, by a process of molecular coalescence, demonstrated in certain artificially formed products," showed that calcium carbonate precipitated from water-soluble salts of calcium in a viscid solution forms spherulites and not separate, single crystals. In 1871, Harting in a memoir, "Recherches de morphologie synthétique sur la production artificielle de quelques formations calcaires organiques," showed that calcium carbonate precipitated from a water-soluble calcium salt by the addition of the carbonate of potassium or sodium is at first of gelatinous consistency and later aggregates into spherulites.

These are instances of two medical men who, while studying the formation of skeletons and abnormal concretions in organisms, were working on the principles underlying the formation of deposits of limestone. It is now known that the same physico-chemical principles underlie similar phenomena whether the phenomena be organic or inorganic. A considerable proportion of the rocks forming the superficial parts of the earth are composed of the skeletons of organ-

¹² Harder, E. C., Iron-depositing bacteria and their geologic relations: U. S. Geol. Survey Prof. Pap. 113, pp. 89, pls. 12, figs. 14, 1919. With a preface by F. L. Ransome. Quotation from preface.

¹³ Vaughan, T. W., Preliminary remarks on the geology of the Bahamas, with special reference to the origin of Bahaman and Floridan oolites: Carnegie Instit. Washington Pub. 182, pp. 49-54, 1914. Paragraph quoted from pp. 41-52 of this article.

isms. If the geologist would understand the conditions under which these organisms lived and how they did their work, he must study the relations of organisms to their environments and the processes involved in the formation of their skeletons. The problem was in a way laid open by the geologists, but it was soon passed over to the physiologist, and Dr. Shiro Tashiro of the Medical School of the University of Cincinnati is now engaged on an investigation of the physico-chemical factors controlling the formation of skeletons and is thereby contributing to the fundamental principles of geologic interpretation.

In the interrelations between geology and medicine so far mentioned, medicine perhaps has little to gain—the gain is on the side of geology, but geology can assist the medical man.

Since it would not be possible for me to review in a satisfactory way in the time at my disposal the contributions that geologic surveys might make to the solution of medical problems of certain kinds, it seems better that I should leave with you a few prepared statements and merely make some comments on these statements. The prepared statements are:

(1) A short article by myself entitled "Geologic surveys and the eradication of malaria."¹⁴

(2) Schedules for the field description of sedimentary rocks, published by the U. S. Geological Survey.

(3) Mimeographed instructions for members of the United States Geological Survey engaged in geologic mapping for military purposes.

I will mention topographic maps which are of much value in handling several kinds of problems in sanitation, particularly problems in drainage. Maps of this kind, if accurate, give the relief of the land surface, which includes the heights of mountains, hills, and divides and the gradients of all slopes. The maps show the high land, the steeply sloping land, the flat land, the stream courses, and any lakes and ponds. With reference to the eradication of malaria the words of Mr. F. L. Hoffman may be quoted.¹⁵

These maps are of special value in that they indicate the stream margins, swamps, ponds, overflowed land, etc., which, broadly speaking, are the underlying topographic conditions chiefly responsible for the local frequency and relative intensity of malarial diseases.

A key map showing the present status of the topographic mapping of the United States may be obtained from the U. S. Geological Survey.

¹⁴ Vaughan, T. W., Geologic surveys and the eradication of malaria: *Southern Med. Jour.*, vol. 11, pp. 569-572, 1918.

¹⁵ Hoffman, F. L., A plea and plan for the eradication of malaria throughout the Western Hemisphere.

One of the duties of the geologist is to study the physical and chemical characteristics and the arrangement of the rocks at and near the surface of the earth. The schedules for the field description of sedimentary rocks will indicate to you what is done in the field for that class of rocks; but in addition to field observations samples of rocks are brought into the laboratory and there subjected to more detailed examinations and tests, whenever such a procedure seems desirable. The weathered products of the rocks are studied, and the effect of weather, dry weather and wet weather, on both the fresh rock and the weathered product are also studied. Another feature that receives particular attention is the topographic expression of each kind of rock represented in any area being investigated. Some rocks are resistant to weather, while others readily yield to eroding agencies—the resistant rocks, therefore, tend to form hills and the nonresistant rocks to occupy the lowlands and valley floors.

In any area being studied at all carefully the rocks are classified according to their physical and chemical characteristics and also according to their age relations, which is in the case of sedimentary rocks the order in which they were piled one on top of another. The surface outcrops of these different kinds of rocks are indicated by appropriate colors on topographic maps as base maps, and on the side of the map blocks of colors are arranged in a column according to the age of the corresponding rocks, the oldest at the bottom. On the side of or below each color block there is usually printed the more salient physical and chemical characteristics of the rocks.

On a finished geologic map there is, therefore, recorded for the person who has learned to read such a map nearly all the natural physical features of the tract of land covered by that map. There is the relief, the physical characteristics of the different kinds of rocks, the way the different kinds of rock express themselves in the topography, and the arrangement of the different rock sheets and igneous rock masses. From these data many inferences are possible.

The value of such information for those who must deal with problems of drainage, the laying out of roads, and the siting of structures of many different kinds is obvious. Information on geologic maps of the United States may be obtained from the U. S. Geological Survey or the respective State geological surveys.

In this connection I will recount an experience I had during the war with an Artillery officer. This officer came to the Geological Survey and asked advice regarding the site for an Artillery camp. He gave his specifications as to climate, amount and distribution of relative relief, nature of the soil, and water supply. I was assigned to make the selection and took him straight to the place he wanted, although I had not been there before. He told me that it was a revela-

tion to him that any one could have such a comprehension of country. I was surprised at his remark because I had been studying for years, not the general but the particular sort of thing he had in mind. I will repeat the nature of the specifications: Climate, a geologist may not be a meteorologist but he must study the interrelations between rocks and weather; amount and distribution of relative relief, that is a subject the geologist must study, and not merely in an empirical way, but he must understand the why of the features of relief; nature of the soil, by which the Army officer meant the physical and chemical characteristics of the rocks at and near the surface, especially as such features would affect drainage and transportation, a matter concerning which I have already said something to you; water supply, a subject to which the Geological Survey has paid particular attention, and I personally had directed the study of ground waters of the Coastal States from the Potomac to the Rio Grande, and the stream-gauging division of the survey had studied the flow and quality of water in most, if not all, of the principal streams.

After the site for the Artillery camp had been chosen, it was desirable to know the nearest supply of material for concrete work, and a geologist inspected the tract with this object in mind, with the result that gravel of the kind desired was found almost at the place where it was needed.

Water supply is a matter of much importance to virtually all classes of people, because water is one of the prime essentials of life and on its relative purity depend the health of those who drink it and the practicability of numerous industrial operations. From the geologic standpoint water is a mineral, for it is one of the constituents of the earth and in considerable quantities it is actually mined by means of mine shafts called wells. Logically, therefore, water is a resource the study of which belongs in the domain of geology, and I will briefly mention the fundamental principles underlying the occurrence of artesian water.

The water obtained in artesian wells is primarily rain water which permeates some porous bed of rock. In order that this water may rise in a well it is necessary for it to be under hydrostatic pressure, which is caused by two factors. The first is the porous water-containing bed must be overlain by a relatively impervious bed; and the second is the water-containing bed, and the impervious bed overlying it must be tilted or bent, so that the water in the permeable bed will, under the influence of gravity, descend to lower altitudes. If such a water-bearing bed overlain by an impermeable cover be perforated by a well at a place where the surface of the ground is appreciably lower than the place at which the water entered the bed, the water will rise to the surface and flow. In areas where the rocks in composition and arrangement do not conform to these general principles,

artesian water can not be found. On the island of St. Thomas in the Virgin Islands of the United States there is no artesian water, because the fundamental conditions are not present there. The island is composed of volcanic rocks and highly metamorphosed impermeable sediments.

Artesian waters are found over enormous areas in the United States, and where they are used there has been marked improvement in health, because such waters are naturally filtered, and at least before reappearing at the surface of the earth they can not serve as breeding places for malaria-bearing and other disease-transmitting mosquitoes.

Before closing these remarks on water, I wish to say that waters derived from cavernous limestones are open to suspicion if they are in polluted districts, because polluted water may enter the underground channels. I also wish to call your attention to the fact that a high chlorine content in water does not necessarily mean contamination. In many places there are sea salts in the rocks, and ground water or even surface water may dissolve some of these salts. Near the seashore sea water may permeate the rocks for considerable distances inland and a certain amount of sea salt finds its way into the atmosphere and is later brought down by the rain.

For the information of those who may be interested, attention will be called to a water-supply paper which gives a bibliography and index of the publications of the United States Geological Survey relating to ground water.¹⁶

In the sketchy paper I have presented to you I have tried, first, to indicate the part imagination plays in scientific research as well as in creative art; second, to give an idea of the scope of geology as a theoretical science by showing that it attempts to explain the origin of the earth and to recount the vicissitudes it and its inhabitants have experienced from earliest time to the present day; third, to show that it is a common, useful science, being one of the two great sciences that deal with the raw products on which the life of man is based; fourth, to point out to you some of the interrelations of geology and medicine; and fifth, to bring to your attention certain geologic information which may be of value to the medical man, particularly in the handling of problems of sanitation.

Besides the general references to topographic and geologic maps and water-supply papers given in the foregoing articles, attention will be called to several other papers:

Brooks, Alfred H., The use of geology on the Western Front: U. S. Geol. Survey Prof. Pap. 128, pp. 85-124, pls. 15-17, fig. 7-16, 1920. Lieut. Col. Brooks was the chief geologist of the American Expeditionary Forces in France, and

¹⁶ Meinzer, O. E., Bibliography and index of the publications of the U. S. Geological Survey relating to ground water: U. S. Geol. Survey Water-Supply Paper 427, 169 pp., 1 pl., 1918.

in this paper he has given the most valuable account by an American of the use of geology in the war. The paper contains a partial list of publications relating to the war work of American geologists. Pages 115 to 121 are devoted to a discussion of water supply.

Gregory, H. E., editor, *Military geology and topography*, pp. 281, figs. 117, New Haven, Conn., 1918. This book is composed of chapters by different authors, as follows: Rocks and other earth materials; Rock weathering; Streams; Lakes and swamps; Water supply; Land forms; Map-reading and map interpretation; Economic relations and military uses of minerals.

Ries, H., and Watson, T. L., *Elements of engineering geology*, pp. 365, figs. 252, John Wiley and Sons, Inc., New York, 1921. There are twelve chapters in this work as follows: The important rock-making minerals; Rocks and their relations to engineering work; Structural features and metamorphism; Rock-weathering and soils; Development work and control of rivers; Underground water; Landslides, land subsidence and their effects; Relations of wave action and shore currents to coasts and harbors; Origin and relations of lakes and swamps to engineering work; Origin, structure, and economic importance of glacial deposits; Road foundations and road materials; Ore deposits.

The following topographic maps, with explanatory text printed on the back, published by the U. S. Geological Survey, may be of service to those who wish guidance in map interpretation:

- Alden, W. C., The country around Camp Albert L. Mills (text on back of topographic map), New York: Map of Camp Mills quadrangle, U. S. Geol. Survey, 1918.
- , The country around Camp Upton (text on back of topographic map), New York: Map of Moriches quadrangle (Camp Upton edition), U. S. Geol. Survey, 1918.
- Butts, Charles, The country in and around Camp Taylor (text on back of topographic map): Map of Camp Taylor and vicinity, Ky., U. S. Geol. Survey, 1918.
- Campbell, M. R., The country around Camp Sherman (text on back of topographic map): Map of Camp Sherman quadrangle, Ohio, U. S. Geol. Survey, 1918.
- Leverett, Frank, The country around Camp Custer (text on back of topographic map): Map of Camp Custer quadrangle, Mich., U. S. Geol. Survey, 1918.
- Matthes, F. E., The country around Camp McClellan (text on back of topographic map): Map of Anniston quadrangle, Ala., Camp McClellan edition, U. S. Geol. Survey, 1918.
- , The country around Camp Gordon (text on back of topographic map): Map of Camp Gordon and vicinity, Georgia, U. S. Geol. Survey, 1918.
- Salisbury, R. D., and Barrows, H. H., The environment of Camp Grant, Ill.: Illinois Geol. Survey Bull. 39, 1918.
- Stephenson, L. W., and Miser, H. D., Camp Pike and the adjacent country (text on back of topographic map): Map of Little Rock quadrangle, Ark., Camp Pike edition, U. S. Geol. Survey, 1918.

PSYCHOMETRIC TESTS FOR RECRUITING STATIONS.

By J. R. POPPEN, Lieutenant, Medical Corps, United States Navy.

It has become more and more apparent that it is impossible to set an educational standard for recruits. To insist on the completion of the so-called grammar school would exclude from enlistment a large

number of men who are well enough endowed with intelligence to be adaptable to naval service. At the same time such a criterion would admit many who were lacking in some of the mental functions which constitute normal intellectual ability. In examining men for enlistment who come from a section of the country where the educational standards are low and illiteracy high it has been found that it is impractical and unjust to require that an applicant be able to answer questions such as are usually given as tests of general information. It would seem that any man who had reached the age of 18 and had normal intelligence would be able to bound his native State or name the present governor. Yet it is not at all unusual to find men who are normally endowed who simply have never had the chance to learn that Chicago was neither on the Pacific nor the Atlantic, or that Lincoln was President during the Civil War and not the first President. It has been found necessary to discard all tests which were based on an educational standard.

And yet it seems not only desirable but necessary that we have some means of determining whether or not an applicant has enough intellectual ability to adjust himself to service conditions. Practically every phase of naval service is unlike anything with which the recruit has come in contact prior to his enlistment. In order to become a good sailor or a man-of-war's-man he must be able to change completely his mode of life. He must be able to adjust himself to an entirely new environment. With our short-term enlistment and the consequent rapid turnover of personnel, a desirable recruit must have enough mental "horsepower" to be able to quickly assimilate training. He must be able to learn quickly and thoroughly and this is not possible unless he is endowed with at least normal mentality. We must have some means of measuring this adaptability, this ability to learn new things.

The close association between mental deficiency and infractions of discipline is too well established to be denied. The man who is unable to adjust himself to service conditions and is unable to see clearly the importance of military regulations is the one who is continually getting into trouble. If we can exclude this man from the service we will eliminate a large percentage of the disciplinary measures which are now found necessary.

The Navy is becoming more and more an organization of specialists. The successful operation of a ship or fleet is not dependent so much on the movement of a relatively large mass of men where mere numbers count as on the efficiency of each individual in a variety of diversified efforts. There is no place for the man who can follow a leader but who lacks the ability to use his own individual initiative in carrying out one special function. This is particularly so at this time when there is increased demand for personal efficiency

on the part of "all hands." It has become imperative that we accept for enlistment only such men as are endowed with enough intelligence to meet these requirements. It is better to enlist one man with normal intelligence than a dozen who are simply "hewers of wood and drawers of water."

Within the past few years there has been developed a large number of psychometric tests by which the fundamental intellectual endowment can be measured. It is now possible to determine accurately at what age an individual's intellect has stopped developing. In our search for tests which would meet recruiting conditions, it has been decided to use only those which were standard and would give results that could be expressed in terms of what is now considered normal. We have tried out a series of tests with these conditions in view and have adopted those which we consider meet the requirements, are standard, and have given results which we feel are of sufficient interest to present to the naval service.

The first question was, What shall we require as a minimum? After carefully reviewing all the duties of the different ratings, keeping in mind the fact that all men are not required to be petty officers but at the same time should be better than common laborers, we decided to adopt a mental age of about 14 years as a minimum. It has been argued that this limit is too high. It is true that this is generally conceded to be above the average American age. This is one of the reasons why we adopted this minimum. It is not the average that is desired. It is not granted that it takes only average intelligence to maintain the highest efficiency of the Navy. The average includes a high percentage of the common laborer, and it is this class we desire to reduce to a minimum.

While it is true that this requirement might exclude from enlistment a number of men who might otherwise be desirable, we feel that if the personnel can be maintained without admitting these few, it is well worth while. It might be added that our tests do not require *exactly* 14-year scores. Two of the 5 used are marked "passed" if the requirements for 12 years are filled. For these reasons we have adopted *about* 14 years as a minimum.

The mental-age standard has been adopted in preference to any series of tests directed toward the measurement of the particular mental functions. It is not desired to determine if an applicant be qualified along any special line. It is simply necessary to determine whether or not his mental development has proceeded to a sufficient degree to make it possible for him to be taught the duties of the lower ratings. However, the tests we have adopted do include measurement of those special functions which we consider as desirable in the service, viz., visual memory, auditory memory, judgment, completion, and abstract logical reasoning. The tests for mental age meet these

requirements better than anything else. They are thorough and can be carried out easily at recruiting stations without the expenditure of much time.

The tests we have adopted are all standard. All but one are taken entirely from the Stanford Revision of the Binet-Simon tests,¹ and that one is the Knox cube test. They conform to the requirements of their authors and absolutely no claim of originality is made in the tests themselves. We have simply arranged and made use of those which we feel best meet the needs of the medical officer on recruiting duty. Methods of conducting the tests and scoring the results are exactly the same as given by these authors.

We have adopted tests which are easily scored and are not subject to variation in interpretation. With a little practice they can be conducted and scored by anyone of normal mentality. Under the stress of a recruiting drive when it is necessary to examine a large number of applicants or under other circumstances when it is impossible for the medical officer to give his own time to the tests they can very well be carried out by some member of the recruiting party who can be trained to give them. They are now being used at substations with very gratifying results.

The final result can be expressed by either plus or minus. Either the applicant has the required mentality or he has not. It is not even necessary to keep a written score throughout the tests. Each test is either passed or not passed and as each is completed it is simply necessary to make a mental note of the result and at the completion of the examination the final result can be determined. We have found it satisfactory to reduce the scoring to a note on the record of physical examinations to the effect that "M" (mentality) is either "+" or "-". The relative importance of the individual tests in determining the final result will be taken up in greater detail a little further on.

Last, but by no means least, is the question of apparatus. The various form boards, score cards, printed test questions, vocabularies, etc., which are the usual impedimenta of psychometric tests have been reduced to a minimum. The entire apparatus consists of several typewritten cards, which can be used an indefinite number of times, and the Knox board. The latter can be purchased for a small sum.² The one we have used was constructed by a chief carpenter's mate on duty at the station at practically no expense.

For these reasons we feel that we have adopted a series of tests which meet in all respects the requirements of the recruiting station. Our tests are thorough, are standard, and are based on the principle of mental age determination. They are applicable to service condi-

¹ Terman, L. M., *The measurement of intelligence*, New York, 1916.

² C. H. Stoelting & Co., Chicago, Ill.

tions because they can be conducted without the necessity of extensive instruction, they do not require the expenditure of a great length of time (the average time per applicant being about 15 minutes), and they require practically no additional apparatus. We will attempt to show in the following paragraphs by the explanation of the tests and by a review of our results that the increased efforts and time called for in conducting the tests are well worth while, not only in reducing unnecessary expense in transportation and training of men who are not adaptable to the service but in raising the general level of intelligence of recruits, thereby reducing the burden of training and increasing the efficiency of the Navy.

It is absolutely essential in conducting these tests to secure the cooperation of the applicant. We must get into agreement with the subject. The applicant is always apprehensive. His surroundings are strange and he is more or less awed by the prospect of his examination. It is necessary to break down his reserve and place him entirely at his ease. We must gain his confidence. This requires considerable tact and can usually be secured by asking a few questions along the line of his previous work, his schooling, his home town, etc. The questions must be asked in a friendly way and all brusqueness and hurry must be avoided. It has been found that a few well directed questions of this nature will almost always place him in a state of mind in which he can do himself justice in the tests. When his interest and confidence are assured it is possible to pass directly into the tests without giving the impression that he is about to undergo an examination.

The impression that the tests are simply a routine must be avoided. It must appear to the applicant that the questions are casually selected from a large number. He must be assured, if he hesitates, that we do not expect him to use a lot of "big words" but simply to tell in his own words what *he* considers the proper answer. Impress him that his judgment is desired more than his knowledge of facts. Many applicants, especially those who have not enjoyed very much education, will give up in despair if they think they are being asked for information which should not be expected from them because of their limited schooling. These men must be assured that we realize their educational deficiencies and all we want to know are their ideas on the subject. These tests are not a "third degree." Friendly cooperation must be maintained throughout or we will fail in our object.

These tests should be conducted in complete isolation from extraneous interruptions. The ideal would be a sparsely furnished room where absolute quiet could be maintained. There should be as little distraction as possible. Unfortunately this is not always possible at recruiting stations. Our greatest handicap has been the fact

that we could not enjoy complete isolation. It is only through the hearty cooperation of the recruiting personnel who have been impressed with the significance of the tests and have refrained from interrupting them that our results have been at all satisfactory. Indeed, it is the fact that our results have been satisfactory that convinces us that the tests meet the needs of the recruiting medical officer. We have been able to get results in spite of the absence of ideal conditions.

The tests we have adopted, in the order in which they are made, are:

First. *Repeating five digits reversed.* (Stanford Revision, XII, 6.) Three series each of three, four, five, and six digits are used. Any combinations may be used as long as consecutive arrangements are avoided. The numbers should be given clearly and distinctly, without the slightest suggestion of rhythm and at a rate a little faster than one per second. It is necessary that the applicant understand clearly what is expected of him. The test is introduced by saying, "I am going to give you some numbers and I want you to repeat them *backwards*. For instance, if I should say, '1-2-3,' then I want you to say, '3-2-1.' Do you understand?"

It has been found desirable to start with groups of three, although the tests are scored according to the ability of the applicant to repeat five backwards. The test is scored "passed" if two of the three groups of five are correctly repeated. The numbers must be correctly repeated in proper order. The score required in this test is that required in the 12-year test of the Stanford Revision. The test is not only an excellent one for immediate auditory memory but serves as a stepping-stone to the tests which follow and are considered of greater importance.

Second. *Know cube test.* This is a test for visual memory and is used to determine the applicant's ability to carry out written instructions. The board is placed squarely before the applicant and he is told, "You see this little block is loose [picking up the small black block]. I am going to tap these other blocks in different orders [illustrating] and then I will place the block there and I will ask you to tap these blocks in exactly the same order that I did. Do you understand?" Counting from the applicant's left the blocks are tapped in increasingly complicated order according to the following scheme:

1-2-3-4	1-4-3-2-1
1-4-3-2	1-3-1-2-4
1-3-2-4	1-3-4-3-2

During this test it is best not to show the applicant whether he is right or wrong unless it is obvious he does not understand, in which case the explanation should be repeated. One of the most

Important features of this test is that of "autocriticism"; that is, it tests the ability of the applicant to decide at the completion of a movement whether or not he has done it correctly. The test is scored "passed" if the applicant correctly repeats two out of the three series of five moves each.

Third. *Giving differences between a president and a king* (Stanford Revision, XIV, 3.) This test is introduced by the words, "There are three main differences between a president and a king; what are they?" It is permissible to urge the applicant on in case he hesitates. Many applicants will immediately express inability to answer the question, but will give correct answers if urged a little. The answers, of course, relate to differences in tenure, power, and manner of accession. The test is marked "passed" if two of the correct differences are given.

The importance of this test centers about the applicant's ability to select from the many differences those which are of the greatest importance. It is a test of judgment and as such serves an excellent purpose in the examination of applicants for enlistment. Almost every one is aware of any number of differences between a president and a king such as difference in name, the fact that a king is supposed to wear a crown and sit on a throne, etc., but it takes normal mentality to be able to select from these the three which constitute the fundamental essential differences.

It has been our experience that, the consensus of opinion to the contrary notwithstanding, this test is dependent to a large degree on education. It would appear, offhand, that any adult man would know that presidents were elected and kings inherit their thrones; that presidents serve a definite period of time, while kings serve throughout life; and that kings are popularly conceded to have more power than presidents. Yet we have found a large number of men who could not be classed as either feeble-minded or morons who were not aware of these facts. For this reason, in those cases in which it is obvious that the applicant has insufficient information to correctly answer this question but is successful in the other tests, we have been inclined to give him the benefit of the doubt and have not insisted too rigidly on a satisfactory score in this test.

Fourth. *Problem questions*. This test, as the previous one, is taken entirely from the Stanford Revision (XIV, 4). "Procedure. Say to the subject: 'Listen, and see if you can understand what I read.' Then read the following three problems, rather slowly and with expression, pausing after each long enough for the subject to find an answer:

"(a) 'A man who was walking in the woods near a city stopped suddenly, very much frightened, and then ran to the nearest police-

man, saying that he had just seen hanging from the limb of a tree a — a what?'

"(b) 'My neighbor has been having queer visitors. First a doctor came to his house, then a lawyer, and then a minister. What do you think happened there?'

"(c) 'An Indian who had come to town for the first time in his life saw a white man riding along the street. As the white man rode by, the Indian said, "The white man is lazy; he walks sitting down." What was the white man riding on that caused the Indian to say, "He walks sitting down"?'"

"Do not ask questions calculated to draw out the correct response, but wait in silence for the subjects' spontaneous answer. It is permissible, however, to re-read the passage if the subject requests it.

It is rather interesting to note that the answer to the second question relating to the birth of an illegitimate child, which Terman gives as an occasional correct response, has been as frequent as any other correct answer in our experience. It is quite surprising to see the nonchalance with which men will give this response as if it were not at all unusual. We hesitate to interpret this as being evidence of moral laxity in this locality.

A satisfactory score is two correct answers out of the three. We have found this test to be one of the most satisfactory. It tests the ability to complete situations. It is pointed out that one of the most desirable attributes of a man-of-war's-man is his ability to decide what to do in unusual circumstances where incorrect judgment might mean disaster. Satisfactory scores are required in this test more rigidly than in any of the others. It is our opinion that if an applicant is not able to answer these questions correctly he is not only below normal in mentality but he is particularly undesirable for the naval service.

Fifth. *Arithmetical reasoning* (Stanford Revision, XIV, 5). "Procedure. The following problems, printed in clear type, are shown one at a time to the subject, who reads each problem aloud and (with the printed problem still before him) finds the answer without the use of pencil or paper.

"(a) If a man's salary is \$20 a week, and he spends \$14 a week, how long will it take him to save \$300?

"(b) If 2 pencils cost 5 cents, how many pencils can you buy for 50 cents?

"(c) At 15 cents a yard, how much will 7 feet of cloth cost?"

This is the only test in which there is any time limit. Only one minute is allowed for each problem. The applicant must not know that his answers are being timed, and for this reason we discourage the use of stop watches. It has been found perfectly satisfactory to time the answers by making mental notes of the time consumed by

unobserved glances at the second hand of a watch or clock. No prompting is allowed in this test except in the case of the third problem, when it is evident that the applicant has misread "feet" for "yards."

An interesting experience made it imperative that we modify this test by interposing different figures without increasing or decreasing the complexity of the problem. In the examination of an applicant the answers were given so glibly that it did not require the faculties of a detective to deduce that he had been "primed." Upon being questioned, he laughingly admitted that a previous applicant had remembered the problems and had told him the correct answers. To preclude a recurrence, which might be expected at times when applicants were numerous, we made additional cards in which different figures had been substituted. For example, in the first problem we substituted "\$15" for "\$14" (in which case 15 months must be considered a correct answer), in the second question we substituted "4" for "2," "25" for "50," etc., in varying arrangements. In this way we have made it impossible for applicants to learn beforehand the correct answers to the problems which will be given them.

For a better and more complete explanation of these tests the reader is referred to those given by Terman in "The measurement of intelligence."

We have applied these tests in the examination of 278 applicants. We have conducted the mental examination before the physical for the following reasons: It was desired to obtain data on a comparatively large number of cases. By so doing we have been assured the confidence of the applicants during the physical examination, and in case the applicant was not qualified mentally, but was physically qualified, it has afforded us the chance of exaggerating some very minor physical defect which would not have disqualified the applicant of itself, thereby avoiding the embarrassment of telling him that he had been found only mentally deficient. This order can be very well reversed to permit of examining a large number of applicants. If an applicant is found physically disqualified, it eliminates the necessity of conducting the mental examination, and this procedure is recommended as the practical method. However, in the few cases in which we have decided to inform the applicant that his "education" was not extensive enough to permit him to successfully compete with other recruits, we have experienced more embarrassment than would ordinarily be expected. It has been found extremely difficult to correlate "lack of education" with the claim that the Navy is "the school of the Nation." For this reason we have found it very convenient to "find" some physical defect.

Of the 278 applicants examined 206 successfully passed the mental examination, or 74.1 per cent. In this connection it is interesting to

note that of the first 50 examined only 60 per cent passed, of the second 50, 66 per cent passed, and from then on the percentage has remained quite constant at about 80 per cent throughout the remainder of our series. This indicates that with the introduction of these tests there was an almost immediate improvement in the class of applicants brought in for examination by the recruiting personnel. Nor has this resulted in a decrease in the total number of recruits enlisted, because our series has been coincident with a rapid increase in recruits to permit our station to rise from the "unsatisfactory" into the "satisfactory" class; 123 passed the physical examination and 108 were accepted for enlistment. Thus there were 15 who were found physically qualified, but were rejected because of failure to pass the mental test.

The 168 rejected are divided into three groups: The first includes those who failed in both the mental and physical examinations, 66. The second includes those who failed physically only, 87, and the third, those who failed mentally only, 15. Only 2 of these 15 were not examined physically, being definitely in the moron class. The other 13 would probably not have been detected as border-line cases without the use of our tests and would undoubtedly have been enlisted. While it is very likely that the two morons would have been detected at the training station and surveyed from the service, it is by no means certain that the other 13 would have been eliminated from the service until after a considerable amount of time, effort, and money had been expended in a vain attempt to train these men for the naval service.

Two of these men who were rejected as constitutionally inferior had applied for reenlistment. In one case the man after serving a few months, deliberately overstayed his liberty. He was tried by a summary court-martial and was sentenced to be discharged with a bad-conduct discharge. This sentence was remitted for six months in accordance with article 1877, United States Navy Regulations. While on this status he deliberately repeated the offense and his discharge was automatically effected. This man was evidently unable to adjust himself to the service. He could not understand the importance of discipline. In this case it is obvious that his mental deficiency was the cause underlying his difficulty and loss to the Navy.

The other case is that of a man who served one 4-year enlistment, reenlisted and served less than a year and then was discharged as a seaman at his own request. In the five years of his service he had not learned the parts of a boat and had never served as a member of a gun's crew. He stated that he had never been allowed to have anything to do with such important work. He had never been able to rise above the most menial duties. He was "shanghaied"

from one ship to another and usually ended up as a messman. That these duties must be performed is granted but there are always enough new men to perform them. This man's type is all too numerous to need further description. The training expended on these men is a total loss to the Navy.

These two cases serve as excellent examples of our object. We wish to exclude those men who by reason of mental deficiency are especially apt to commit infractions of discipline and those who for the same reason are not susceptible to training.

We are convinced by these results of the value of our tests. We have been able to make an appreciable saving to the Government in transportation and useless training. If these men who are evidently not desirable can be excluded at the recruiting station it will result not only in a reduction in the cost of training per recruit but will raise the general average of efficiency of the entire personnel of the Navy. By these tests we are able to exclude those men who *a priori* will be unable to properly adapt themselves to service conditions, will not have sufficient mentality to be taught the duties of man-of-war's-men and represent a relatively high percentage of potential delinquents.

In conclusion, in our search for psychometric tests which would be independent of education, could be successfully carried out at recruiting stations, and would result in detecting those applicants who are not desirable for the naval service because of deficient mentality, we have adopted a series which we feel meets all the requirements. They are based on standard tests for mental age. They can be carried out without the institution of elaborate and costly apparatus and can be conducted by anyone of normal mentality within a comparatively short space of time.

These tests are not presented as a panacea for the medical officer on recruiting duty. They are in addition to the examination of applicants for enlistment which are now prescribed. They are of no value in detecting the constitutional psychopath. Indeed, the neuresthenic and the potential psychopath usually make a very creditable showing in these tests. They are offered as a solution of the problem of detecting the mental defectives and the establishment of a standard requirement for admission into the naval service. They meet a need we have long felt in the examination of men whose education has not been up to standard.

We desire to add that throughout this work we have enjoyed the most hearty cooperation and encouragement of the officer in charge, who instead of disparaging our efforts in order to procure a larger number of recruits has insisted on the rigid application of the tests with the view to increasing the personal efficiency of each individual

recruit. Appreciating the need for improvement and the value of these tests in raising the standard for admission, he has approved our rejections for mental deficiency at the expense of his recruiting score. It is our opinion that an appreciation of the value of the work will prompt the adoption of a similar attitude on the part of all other officers on recruiting duty who have the interest of the service at heart.

THE PROBLEM OF MALARIA IN MARINES IN HAITI.¹

By A. H. ALLEN, Lieutenant Commander, Medical Corps, United States Navy.

Malaria was responsible for 16,986 sick days in the First Brigade in 1921. The average strength was 2,115, the number of admissions was 2,056, hence almost every man and officer who served in Haiti during the past year was infected. Figuring on a private's pay only for these cases, the loss to the Government was over \$26,000. This does not include the cost of medicine, medical attendance, transportation, hospitalization, etc. In the first six months of 1922 the number of admissions was 425, with 4,358 sick days. Five deaths occurred in 1921, and three deaths so far this year. In any community in the United States the presence of a disease causing so much damage would result in an active campaign directed against it. Apparently because the brigade lives in Haiti it is expected to acquire malaria and very little attention is paid to it. This state of mind is wrong. We know a great deal about malaria, including its cause and mode of transference, and have all seen it disappear in other localities in the world, especially in Panama and Cuba, after a few years of intelligent work by medical men. Coincident with the prevention of malaria other sanitary improvements have been made because it is impossible to prevent mosquito breeding without drainage, clearing up swamps and underbrush, policing yards of houses and in general establishing good local sanitary conditions.

The first reply one makes in answer to the question of preventing malaria in the brigade is that it would cost millions of dollars because each one thinks in terms of sanitary engineering in view of the work in Panama and Cuba. We can't get the millions to spend in Haiti, so discarding any comprehensive plan of cleaning up the island, our problem is to allow the marines to live in Haiti without contracting the disease. The source of malaria is the infected native. As we have no definite knowledge of the malarial incidence, it is fair to presume that 100 per cent are infected some time during life, probably in early childhood. It is estimated that there are 2,000,000 native inhabitants. The mode of transference is the anopheles

¹ A paper read at the quarterly conference of medical officers in Haiti, Sept. 11, 1922.

mosquito. We have no accurate knowledge of the prevalence of this mosquito in any district. I have been told by some medical officers that they have never seen an anopheles and have had other medical officers show me psorophora and tell me they were anopheles. It is again fair to presume that anopheles are fairly common throughout Haiti except in cities. The incubation period is from 10 days to 3 weeks before the disease shows itself in its true colors.

The Haitian malaria is not the ordinary "chills and fever" with which we have been familiar in the United States or occasionally on board ship. I am sure that all brigade medical officers will agree when I say that it is a severe disease, usually not following the classical description, a disease which requires careful treatment and nursing, and a disease which is prone to relapse. Many cases of the so-called benign tertian type do not give the tertian type of fever, but show fever daily. Vomiting is a fairly constant feature. Keeping these facts in mind, it will be seen that the greatest medico-military problems in the brigade is the prevention of malaria.

The means toward this end may be grouped under two heads.

- First. Destruction of malarial parasites in the blood of human carriers.

Second. Elimination of anopheles mosquitoes.

Until recently I believed that the first consideration should be the elimination of mosquitoes, but in Haiti, in its uncivilized state, the destruction of anopheles mosquitoes on a sufficiently large scale to have any effect on malaria is still far in the future. We must not put the cart before the horse. Sexual development and permanency of infection reside in the human being, not the mosquito. From our records it appears that over 90 per cent of malaria cases originate in the hill districts. This is indicative of the phenomena seen in the southern United States and called attention to by Fricks, of Memphis, Tenn., and Welch, of Montgomery, Ala., and is to be ascribed to the lessened number of anopheles in towns and not the lessened number of malarial carriers. Bass, of New Orleans, La., has pointed out that with the development of cities, even with very little attention toward sanitary features, the solution of the problems of sewage, drainage, and clearing of underbrush, etc., has in the past been sufficient to stamp out malaria. The farther civilization progresses the less malaria there is. Malaria, therefore, may be considered as an index of the stage of civilization of a country.

During the seven years of occupation of Haiti by marines a great deal of effort has been directed toward drainage of camps, screening of buildings and elimination of mosquito-breeding areas. This is all excellent and must be continued, but it certainly hasn't had any perceptible effect on the prevalence of malaria. We have completely

ignored the source of infection, and I believe now is the time to endeavor to reach that source. The camps throughout the island are all located within a short distance of native towns. Brigade medical officers can ascertain by personal visits approximately the number of fever cases in the towns. I believe that with the aid of the French priests and local authorities the natives can be sufficiently interested and educated to take a certain amount of quinine, if given free by the medical officers. In an ordinary infection 20 grains of quinine for two days will so diminish the actual number of parasites in the peripheral blood that a prolonged search is necessary to locate any microorganisms. If, in a drop of blood large enough for a blood smear, parasites are absent or very rare, after only 20 grains or so of quinine and continue so for about 10 days, then it is fair to presume that the anopheles will experience a similar difficulty in becoming infected. At all events, according to the theory of probabilities infection of the mosquito should be greatly lessened. For this reason therefore I believe it advisable and justifiable to give quinine freely to all natives having fever and living in the vicinity of a marine post as a prophylactic for the marines. I know the natives will not take "the brigade follow-up" treatment, but I feel that they will take free quinine for three or four days, especially if the priests tell them of its advantage. Even three or four days' treatment may prevent that native from infecting mosquitoes for a couple of weeks, and that surely is a gain.

Bass in the July 22, 1922, number of The Journal of the American Medical Association, in comparing antimosquito work and control by quinine says: "When we compare the two measures from the broad standpoint of reaching the real malaria problem of this country I believe we must look to quinine as a most important factor." I would suggest that in the camps the cooperation of the priest and head men be first secured. I would ask the priest to give a talk to the natives at church and explain to them what benefits they may expect to derive from the drug, and especially on the point that it is free, as an indication of the generous attitude of the United States. I would try to get each native who feels sick to take at least a 10-grain capsule in the morning and 20-grain capsule at night and to continue this 30 grains daily for at least a week. I do not expect to cure malaria by this short treatment, but I do expect to make this individual native innocuous for two or three weeks and to educate him sufficiently so that he will return for more medicine when his fever returns. This idea seems feasible to me, and while it presents certain obstacles, yet these are not insurmountable and can be handled locally. It goes without saying that no compulsion of any sort must ever be used.

Under this same heading of destruction of parasites in human carriers comes the "follow-up" treatment. For the benefit of those medical officers not in the brigade, it is as follows:

On discharge from sick list patient receives 15 grains of quinine sulphate (capsules) by mouth four times daily for 21 days from starting treatment, then:

Thursday evening----	Calomel grs. V.
	Quinine sulphate (caps.) grs. XV.
Friday morning-----	Magnesium sulphate or Seidlitz powder. Quinine sulphate (caps.) grs. XV.
Friday noon-----	Quinine sulphate (caps.) grs. XV.
Friday night-----	Quinine sulphate (caps.) grs. XV.
Saturday morning----	Quinine sulphate (caps.) grs. XV.
Saturday noon-----	Quinine sulphate (caps.) grs. XV.

This procedure to be continued for eight weeks.

This procedure was inaugurated by a former brigade surgeon in order to give brigade medical officers a definite guide to treatment and to guard against insufficient medication. It has been and is the subject of a great deal of discussion. My personal impression is that it can safely be modified, especially after the temperature has been normal for a few days by giving smaller amounts of quinine. I think 30 grains of quinine daily up to three weeks, giving 10 grains in the morning after breakfast and 20 grains at night after sundown will prove sufficient. By giving the larger dose at nightfall the unpleasant effects of quinine are fairly well avoided during the day. I see no reason for the calomel and salts routine, and believe this should be eliminated unless the patient actually requires a cathartic. Ochsner, in the Journal of the American Medical Association of March 17, 1917, gave a number of rules to be observed in the administration of quinine, the most important of which are that quinine must be kept constantly in the circulation for at least 48 hours in order to kill all plasmodia which belong to the one, two, and three day types. Quinine will not kill the plasmodium in spore form. Quinine is entirely eliminated in six hours.

The alimentary canal should be in a suitable condition to absorb quinine by mouth, and absorption is much more complete following hot soups or hot water. The use of quinine should be entirely interrupted for a sufficient interval after all adult plasmodia have been killed to permit the spores to develop sufficiently to be killed by quinine, but not long enough for new spores to form, i. e. the interval should be less than seven days. In his outline of treatment he recommends an exclusive hot soup diet for 10 days after cartharis by castor oil, and gives two grains of quinine in a half capsule in one-half pint of hot water every two hours night and day. He insists on waking the patient up for medicine and continues this for 30 doses. The

following six days he gives no quinine but substitutes 1/50 grain arsenous acid in one-half pint of hot water. After this he again returns to the same method of giving quinine as previously outlined and finishes with a general tonic. This method has certain advantages but the amounts of quinine are too small and no follow-up scheme is given.

In our experience and the experience of the United States Public Health Service a standard form of treatment to prevent recurrence is considered necessary. In the brigade we differ with the United States Public Health Service in that we allow a rest period according to Ochsner's plan. My suggestion in this respect therefore in modification of the present "follow-up" routine is as follows:

Allowing three days, after 21, on the 25th, 26th, 27th, and 28th day by giving 20 grains at nightfall and continuing this alternate medication and rest I believe in two months' time we can sterilize at least 90 per cent of the patients. At any rate it is fair to assume that even if we haven't completely disinfected the individual, his power to infect mosquitoes is gone. To put the matter briefly; after the temperature has been normal for 5 days give 30 grains of quinine sulphate by mouth up to 3 weeks. Rest 3 days. Give 20 grains at night for 4 days. Rest 3 days; quinine again, and so on up to 60 days after the diagnosis has been made.

Under the second heading, that is the elimination of the anopheles mosquito, I believe we have something to learn. I feel that our efforts in this direction have not been sufficiently intelligent in that we fail to take into consideration the habits of the anopheles and devote our inspection time in looking for breeding places of all mosquitoes. We devote a lot of time and energy in searching out and eliminating culex breeding areas and we rely entirely too completely on the use of crude oil sprayed on surfaces. The use of crude oil gives us all a false sense of security. Mosquitoes will breed under a crude oil film, as I have personally demonstrated to several brigade medical officers. Oil has to be employed according to the local conditions. Crude oil is not satisfactory in all cases. An oil for use in this climate should have at least a viscosity of 35° per minute at 100° F. on the Saybolt scale. The specific gravity should not be below 32° Baumé. A mixture of 2 pounds of sawdust in a bucket of oil will spread more evenly and hold its film intact in the breeze better than oil alone. In areas near camps filling in pools and draining swamps and cutting underbrush will prevent more breeding than any amount of oiling.

We should keep in mind that the destruction of the anopheles is what we are after and the prevention of other mosquitoes is incidental. The anopheles is rather more particular in its habits than culex in that it prefers clean water in which to lay its eggs. It

seems to prefer the edges of brooks, among reeds in clean marshes and in clean rain-water barrels. The culex on the other hand will breed where there is water no matter how dirty or how small in amount. This desire for clean water on the part of the anopheles may account for their lessened number in cities and also explain the apparent paradox that in dirtiest slums of cities such as Philadelphia, where mosquitoes are present by the millions, malaria is absent. A little more intimate knowledge on the part of medical officers on the life history of the anopheles and its identification as well as a little reading of the later reports on antimosquito work, especially in the matter of subsoil drainage and the limitation of the use of oil will prove to be very valuable.

As to the treatment of malaria our dependence is placed entirely on quinine. The sulphate is given in 15-grain capsules 4 times daily. This dose is large and personally I am inclined to think unnecessarily so. Vomiting is generally present in these cases, which has caused us to seek some other route of administration than by mouth. Intravenously, in the brigade, quinine has been given over 1,600 times with no complications or bad results. The salt used is the hydrochlorosulphate, of which 10 grains is given in 10 c. c. of distilled water. The effects of this medication are often as striking as the administration of salvarsan in syphilis. We are dealing with a blood parasite in both diseases, and I am almost persuaded that the proper first treatment of the severe malaria we see in Haiti calls for enough intravenous quinine injections to control the disease, after which it is advisable to administer the sulphate by mouth to complete the cure, and sterilize the patient. At all events we are accurate in making the flat statement that when properly administered intravenous quinine is perfectly safe and the quickest known method of getting the patient cinchonized.

Voegtlin in the Journal of the American Medical Association of August 5, 1922, states that "The intravenous injections of quinine in malignant malaria is not merely advisable but absolutely indicated as an emergency measure." He continues: "With regard to the efficiency of intravenous quinine injections clinical observations agree that the action in extreme cases is more prompt than when the drug is given by mouth, and the patient's life may be saved. However, as soon as the critical condition has passed, quinine should be given by mouth for the reason that the available evidence shows that malaria is not more readily cured by intravenous medication." The latter statement as made by Voegtlin is quoted from an article by Clayton Lane, "Malaria—A critical review," Tropical Disease Bulletin 19, 93, 1922. He adds in support of this the report made by Ramsden, Lipkin, and Whitley in the Annals of Tropical Diseases

and Parasitology, No. 223, of October, 1918, which concluded that, "90 per cent of the quinine injected intravenously in man disappears from the blood within one minute and is stored in the tissues."

CONCLUSIONS.

1. In Haiti it is impossible to eradicate anopheles in sufficient number to have any appreciable effect on the incidence of malaria.

2. By giving quinine to natives free when they have fever a certain number of human carriers can be rendered noninfective to the mosquito for a period.

3. By this procedure a certain amount of education is being given the native, which may in years to come result in a diminution of malaria in Haiti.

4. The cost is negligible in consideration of the benefits expected to be derived.

5. Intravenous quinine is a most valuable procedure and should be used in severe infections where rapid cinchonization is required.

6. A "follow up" treatment with a rest period weekly is necessary for at least 60 days.

THE FUNCTIONS AND ORGANIZATION OF MEDICAL CORPS UNITS SERVING WITH THE MARINE CORPS IN THE FIELD.

By S. N. RAYNOR, Major, United States Marine Corps.

THE ADMINISTRATIVE ORDER.

In the article appearing in the August number of the Naval Medical Bulletin reference was made to the administrative order in connection with the preparation of the field order (attack order in this instance) by the G-3 of the General Staff.

In this article an attempt will be made to explain the purpose of the administrative order and to give an outline of the information and instructions embodied therein.

The object of the administrative order is to outline the operations of the several supply branches and administrative services of the division; to coordinate their activities within themselves and with those of the combat arms, and to transmit to the command the commander's plan of supply, administration, and evacuation. It may be complete in itself or it may be accompanied by annexes. The administrative order and the annexes (if any) thereto promulgate to the command those orders and plans which the several elements of the command should know.

In general the administrative order of a division shows the location of railhead, supply establishments, refilling and distributing points for rations and ammunition, dressing stations, hospitals and

collecting stations, and collecting stations for sick and wounded animals; instructions for maintenance of roads and circulation and traffic control thereon; instructions for the evacuation of the sick and wounded men and animals; instructions for salvage and burial, military police, prisoners of war, and the trains.

The services and agencies of the division deal with important administrative matters incident to the supply, health, and general welfare of the division. Their operations must be carefully coordinated and prescribed *in orders* to prevent conflict and confusion and to communicate to the troops the methods by which those agencies serve the division in the different situations which arise. This is accomplished by requiring each chief of service or supply branch to submit his recommendation for the operation of his service to the G-1 or G-4 section for his coordination and approval. After careful consideration of the recommendations of these different officers, they are incorporated by the G-4 section in the administrative order and submitted through the chief of staff to the division commander for his approval and then published to the command. The greater part of the administrative order is composed of the recommendations submitted by the chiefs of the various services and supply branches.

It is customary for G-1 and G-4 to call a conference of the chiefs of the branches and other supervised staff officers as soon as the tactical plan is known, explain the situation to them, discuss such matters as may need clearing up, and then direct them to submit their recommendations. In this manner G-1 and G-4 are able to bring the services in close touch with one another, to discuss matters in which all are interested, to prevent misunderstanding, and to insure the teamwork which is so necessary for the successful accomplishment of the many administrative details which must be worked out.

In this article we are not concerned with questions of supply and traffic circulation and control except in so far as they apply to the Medical Department.

Before the division surgeon can formulate any recommendations as to the plan of evacuation he must avail himself of the various sources of information open to him (see article in the September issue of the Naval Medical Bulletin) and consult freely with the chiefs of the sections of the general staff.

The plan of evacuation of a division is usually submitted in the form of a field order, of the medical regiment, containing the subject matter of the paragraphs of the plan of evacuation as published in the administrative order. The purpose of this plan of evacuation is to set forth in detail all of the data relating to the evacuation which is necessary for the various staff officers, surgeons, medical units, and combat organizations concerned. This information must

be presented in a concise and orderly manner in order that the portions of the plan affecting the duties of these various officers and units may be found without delay and may be quickly and easily interpreted and executed. As G-3 and G-4 will extract a part of the plan for incorporation in the field and administrative orders, such subject matter should be placed where it can be readily found and so worded that it can be inserted in the proper order without paraphrasing.

The entire plan of evacuation is submitted to G-4. As soon as it has been checked or changed (to coordinate it with the entire G-4 plan) and approved, it is distributed in order to secure early action and to avoid the delay incident to the preparation of the administrative order. The plan of evacuation must cover all of the essential details of disposition and function of the medical service. Its preparation involves careful consideration of the following:

- (1) The mission of the combatant troops.
- (2) The enemy's force, including
 - (a) Strength, composition, type of artillery and aircraft and position as affecting the distance from the front, cover, and routes of medical units.
 - (b) Position, as affecting observation, fire, duration of action, and movement of our own combatant troops.
 - (c) Movements, as affecting position of our own combatant troops.
 - (d) Probable intentions, as affecting the disposition of our own combatant troops and, consequently, the medical service and the number of casualties on both sides.
- (3) Our own force (combatant and auxiliary).
 - (a) Strength and composition, especially artillery as affecting enemy artillery, and our medical units.
 - (b) Our position and zone of action, as affecting casualties and cover, sites and routes for medical units and routes of evacuation.
 - (c) Our supporting troops, especially division, corps, army, or communications zone medical units or establishments.
- (4) Probable subsequent action of combatant commander.
 - (a) Continuation of movement, pursuit, flank guard, withdrawal and method; position in readiness; retreat and method; strength of rear guard; attack—frontage and method; delaying action—frontage, duration, direction, and method of retirement; defense—frontage, duration, fire cover.
- (5) Probable effect of weather or roads on any of the foregoing considerations.

(6) Decisions as to use of medical service.

- (a) Decision as to number of casualties to be prepared for.
Decision as to number of enemy casualties to be prepared for.
- (b) Decision as to probable duration of action.
- (c) Consideration of means of evacuation available and decision as to means and methods.
- (d) Decision as to amount and method of procurement of evacuation service.
- (e) Decision as to amount of local medical establishment used and reserves to be held out.

The following is an example of a field order such as might be issued by the medical regiment of an Infantry division in an attack:

Field Orders }
No. 6 }

1st Med Regt
GOLDENVILLE, PA
28 June 22, 11:20 AM

Maps: Topographical map, Gettysburg-Antietam, 1:21120, Arendtsville, Hunterstown, Knoxlyn and Gettysburg sheets.

1. A hostile reenforced brigade occupies the ridge from hill 602 to hill 597 (southeast of Hunterstown) and is entrenching the four spurs that project westward. Red artillery is located east of the orchard near hill 603 and near road junction 592.

1st Div attacks enveloping hostile left. March conditions cease at 10:40 AM

Dispositions:

- 1st Brig attacks three northern spurs.
- 2d Brig (less 4th Inf less 1 bn) and attached tanks attacks southern spur and envelops enemy's left.
- 4th Inf (less 1 bn) division reserve north of VARNEY.
- 1st FA vicinity HERMAN supports 1st Brig.
- 2d FA vicinity VARNEY supports 2d Brig.
- 101st FA vicinity GOLDENVILLE supports attack of division.
- 1st Cav (less Tr C) near FAIRVIEW SH covering right flank.
- Tr C 1st Cav covers left flank.

Boundary between brigades: J. WEAVER—RJ 538—RJ 556.

Line of departure: Assault echelons cross ROCK CREEK at 2:00 PM.

2. The 1st Med Regt, and attached army units, will cover the division in the attack.
3. a. (1) Sn Bn (less Sn Cos Nos 1 and 3) via HILLTOWN—MUMMASBURG—RJ 611 road to vicinity woods one mile north of RJ 611. Cover collection 1st Div.
- (2) Sn Co No 1 to vicinity stream crossing 1000 yards southwest of HERMAN. Position in readiness to establish collecting station to cover collection 1st Brig Sector.
- (3) Sn Co No 3 to vicinity RJ 513. Position in readiness to cover collection 2d Brig Sector.
- (4) Sn Co No 2 complete march collection and then to reserve at station of sanitary battalion. Maintain march collecting station No 3 as casualty truck head until relieved. See c.

- b. Amb Bn (less Amb Co No 1) to vicinity woods 1 mile north RJ 611. Routes as for Sn Bn. Cover collection 1st Div. Amb Cos No 1 and 3 active. Amb Co No 2 complete march collection, then to reserve station of Amb Bn.
 - c. Hosp Bn to vicinity woods 1 mile north RJ 611. Route as for Sn Bn. Cover collection 1st Div by sorting hospital thereat. Two companies active, one in reserve. Establish casualty truck head at MUMMASBURG relieving detachment Sn Co No 2.
 - d. Surg Hosp No 801 to vicinity SEVEN STARS via CASHTOWN. Establish to cover 1st Div.
 - e. (1) Vet Co No 1 via HILLTOWN AND MUMMASBURG to vicinity farm on unimproved road 1400 yards south of RJ 644. Establish veterinary collecting station.
 - (2) Vet Co No. 801 to vicinity SEVEN STARS. Evacuation point for animals of 1st Div.
 - (x) Prisoners of war will be routed through battalion and regimental medical sections to collecting stations. They will be used as litter bearers enroute to rear only.
4. a. Serv Co No 1 to vicinity woods 700 yards north of RJ 611 via route of Sn Bn.
- Medical supply refilling point: CHAMBERSBURG.
- b. Ambulance routes: Day route to hospital station—RJ 513—CR 488—BOYD SH—RJ 630—RJ 644. Return east on unimproved road RJ 646—BOYD SH—CR 488—RJ 573. Night route to hospital station: CR 608—CR 648—RJ 644. Return on unimproved road east to RJ 646—RJ 630—CR 621—CR 608. To and from surgical hospital: RJ 611—CR 625—RJ 593.
- c. Destinations: All cases to hospital station. Slight cases thence to casualty truck head MUMMASBURG, thence by truck to CHAMBERSBURG. Non-evacuables from hospital station to surgical hospital at SEVEN STARS.
- d. Routine classification.
- e. Evacuation by army. Evacuation point: CHAMBERSBURG.
5. Hq 1st Med Regt and Div Surg Office vicinity hospital station.

M
Col Med Corps
Comdg

APPROVED:

X

AC of S G-4

Distribution:

C of S	Surg office
G 1	Surg First Army
G 2	C O 1st Med Regt
G 3	
G 4	

Explanation of abbreviations used: Bn for battalion; FA for Field Artillery; Tr for Troop; SH for schoolhouse; RJ for road junction; Sn for Sanitary; Serv for service; CR for cross roads; meanings of other abbreviations are self evident.

When the field order of the medical regiment has been written and checked it would be transmitted to G-4 with a memorandum similar to the following:

Goldenville, Pa.,
2 June, 1922, 11:20 AM.

MEMORANDUM TO G-4.

SUBJECT: Transmits plan of evacuation for 1st Division action of 2 June 22.

1. Attached hereto find FO No 6 Med Regt containing plan of evacuation 1st Division for the attack of 2 June 22.

2. It is recommended:

a. That all empty trucks enroute to Chambersburg be reported to the casualty truck head Mummasburg (Methodist Church) for the transportation of slight cases.

b. That prisoners of war be routed through battalion and regimental medical sections.

c. That action be taken to secure interment of the dead on the basis of a total of 216 Blue and Red casualties.

M
Colonel "Division Surgeon"
Surgeon.

When G-4 has received the recommendations of all the chiefs of services and supply branches and the G-1 part of the order, he puts the establishments on the map, directs his assistant to draw up a tentative circulation map and completes a draft of the administrative order which he then submits to the chief of staff for approval. When the order has been approved it would be issued in the following form:

1st Div
GOLDENVILLE, PA
2 June 22, 12:00 noon.

ADMINISTRATIVE ORDERS } To accompany FO
No. 6. } No. 4.

Maps: Topographical Map, Gettysburg-Antietam, 1:21120, Arendtsville, Knoxville, Hunterstown and Gettysburg Sheets.

I. SUPPLY:

A. Railhead: CHAMBERSBURG (unchanged).

B. Rations:

1. DPs, 2 June as follows:

McKNIGHTSTOWN:

1st Cav----- 3:00 PM
1st Brig----- 3:30 PM
2d Brig----- 4:30 PM

MUMMASBURG:

1st FA Brig----- 3:00 PM
1st Engrs----- 4:00 PM
1st Med Regt----- 4:30 PM
AS----- 5:00 PM
Others----- 5:15 PM

2. The Div Tn will move east on the HILLTOWN-MUMMASBURG road and return on the SEVEN STARS-CASHTOWN road.

I. SUPPLY—Continued.

C. Ammunition:

1. DPs:

1st Brig—CR 608 (east of GOLDENVILLE)

2d Brig—BOYD SH

FA Brig—CR 679

2. The motor section ammunition train will use the HILLTOWN-MUMMASBURG road, and after dumping at CR 679 will take the circuit CR 648—RJ 703—CR 679 for its return trip.

Combat wagons of the 1st Brig, and artillery regiments will use the MUMMASBURG—HUNTERSTOWN road.

- D. Water will be procured locally. That for drinking purposes will be chlorinated.

II. EVACUATION.

By army

A. Men:

1. Coll Stas: Road crossing at stream at (351.4—757.5) and RJ 513.
2. Hosp Sta: One mile north of RJ 611.

B. Animals:

1. Coll Sta: Farmhouse (347.5—755.3).

III. ROADS.

A. Restrictions:

1. In the advance roads will be used as follows: 1st and 101st FA, MUMMASBURG—HUNTERSTOWN road. 2d FA, VARNEY—CR 551—CR 401—RJ 543—RJ 576.
2. Combat wagons and ambulances covering 1st Brig will avoid CR 608 until 3:00 PM. Those covering the 2d Brig will use roads south of the line J. WEAVER—RJ 538—RJ 592.

B. Maintenance:

1. All roads and bridges will be inspected as rapidly as the advance permits. Bridges will be reinforced when necessary to accommodate artillery and heavily loaded trucks.
2. Traffic direction signs will be posted as the advance progresses.

C. Circulation:

See circulation map attached. (*Omitted*).

IV. SALVAGE AND BURIAL:

A. Salvage:

1. Evacuation to DPs by organizations.
2. Captured material will be evacuated under the direction of the D Q M.

B. Burial:

1. The 1st Engrs will send one company with the necessary tools and transportation to report to the QM at RJ 573 at 3:00 PM, for burial duty.
2. The Div Chap is charged with the preparation of the records and reports.

- C. Equipment found on the dead will be evacuated as salvage.

V. MILITARY POLICE.

A. Traffic Control:

1. By P M in rear of front line regiments. Traffic control posts will be established at all important points in the road net and at DPs during the hours of distribution. Officer traffic control posts will be established at crossroads 608 and 648.

V. MILITARY POLICE—Continued.

A. Traffic Control—Continued.

2. Priority after 1:30 PM.

1. Ambulances and vehicles carrying signal equipment.
2. Road material.
3. Combat trains.
4. Ammunition train.
5. Field trains.

B. STRAGGLER LINE.

1. A straggler line will be established along the TABLE ROCK—CR 608—CR 648 road.
2. Coll P: CR 608.
3. All infantry stragglers will be reequipped and returned to brigade command posts; all artillery and engineer stragglers will be returned to regimental command posts

VI. PRISONERS OF WAR.

A. Coll P: farm road just N of GOLDENVILLE.

B. Evacuation: by organizations to straggler line

VII. TRAINS.

A. Service Trains:

1. Released.
2. Bivouacs:
 - (a) Am Tn—southern part of MUMMASBURG.
 - (b) Div Tn—CALEDONIA PARK.
 - (c) 1st Engrs—1/2 mlie NE of MUMMASBURG.
 - (d) 1st Med Regt—along the RJ 644—RJ 611 road.

B. Field Trains:

1. Will march in one column via the CASHTOWN—SEVEN STARS road.
2. Bivouacs:
 - 1st Cav—just E of SEVEN STARS.
 - 1st Brig—along MARSH CREEK NE of MCKNIGHTSTOWN.
 - 2d Brig—along MARSH CREEK N of MCKNIGHTSTOWN.
 - 1st FA Brig—along the creeks W and SW of MUMMASBURG.
3. Orders for field trains to move forward to issue rations will be given later.

C. Courier service between all trains and G-4 office will be maintained throughout the attack.

VIII. MISCELLANEOUS.

A. All packs or other equipment not carried forward in the attack will be placed in dumps by each regiment and left under suitable guard.

Report will be made to the G-4 office of the location of each dump.

B. Distribution of mail will be suspended during the attack.

C. Reports of captured material will be rendered as of 6:00 PM daily, covering the following:

Artillery, giving caliber.

Machine Guns, giving make.

Transportation, other than wagons, giving description and location.

Other material of importance, giving description and location.

By command of Maj Gen A

C

C of S.

VIII. MISCELLANEOUS—Continued.

OFFICIAL:

X

AC of S, G-4.

Distribution:

C G	Engr	1st FA Brig
A D Cs	Fin O	1st Obsn Sq
C of S	Hq Comdt & P M	1st Engrs
G 1	Inspr	1st Med Regt
G 2	J A	1st Sig Co
G 3	O O	1st Tk Co
G 4	Q M	Div Tn
Adj	Sig O	First Army
A S O	Surg	I Corps
Chap	Post Sec	1st Cav
Cml O	1st Brig	War Diary
D M G H O	2d Brig	File

Explanation of abbreviations used: DPs for distributing points; AS for Air Service; Tn for train; numbers in parentheses such as (351.4-757.5) refer to the coordinates of a given point on the map; D Q M for Division Quartermaster; Chap for Chaplain; PM for Provost Marshal; Coll P for collecting point; AM for ammunition; C G for Commanding General; A D Cs for Aides-de-camp; A S O for Air Service Officer; Cml O for Chemical Officer; D M G H O for Division Machine Gun and Howitzer Officer; Fin O for Finance Officer; Hq Comdt & P M for Headquarters Commandant and Provost Marshal; Insp for Inspector; J A for Judge Advocate; O O for Ordnance Officer; Sig O for Signal Officer; Post Sec for Postal Section; Tk for Tank; other abbreviations have either been explained or their meanings are self evident.

NOTE.—The text of this article has been compiled from pamphlets used at the General Service Schools, Fort Leavenworth, Kansas. The sample orders contained herein were quoted verbatim. The writer disclaims any credit for originality.

THE PSYCHONEUROSES AND THEIR TREATMENT.¹

By Maj. WILLIAM O. KROHN, Medical Reserve Corps, United States Army.

For the purpose of discussion, we will limit ourselves to the three cardinal psychoneuroses—viz, neurasthenia, psychasthenia, and hysteria—for these three comprise practically all the cases of functional nervous diseases. The isolated cases of eneuresis, stammering, and the like are so few in comparison with the three main groups that they do not justify much more than mere mention in a discussion so general as this must needs be.

¹ Read at weekly conference of the medical staff, United States Naval Hospital, Great Lakes, Ill.

NEURASTHENIA.

By neurasthenia, I mean the real functional nervous disease as known to neurologists. The term neurasthenia has been applied so loosely that it is necessary to recall to our minds its real definitive meaning.

The surgeon uses the word incorrectly when he refers to the restlessness evidenced by a patient recovering from a surgical wound or a fracture. True, a patient compelled to endure the prolonged and painful experience of a Buck's extension apparatus becomes exceedingly nervous and irritable but as soon as the cause, such as the chafing splint or the tugging weight, is removed the nervous symptoms subside almost immediately.

Again certain so-called neurasthenic symptoms may be present at various stages of organic brain disease as in general paralysis of the insane. But these are not cases of neurasthenia; they are only incidental phases of a much more serious condition.

By neurasthenia, neurologists mean a real functional nervous disease, a true psychoneurosis that is characterized by increased irritability and increased exhaustibility. It does not come on suddenly, but is slow and insidious in its development. The patient is like an overly tired child whom you can not interest in the brightly colored toy or the other amusements and playthings that under normal conditions would absorb his attention. The only sign of attention you evoke is an increased and repeated irritability. Likewise neurasthenia in the adult in its final analysis is an expression of rather profound and abiding fatigue, both in the increased irritability and increased exhaustibility. To use a rather common expression, neurasthenia is nothing more or less than *nervous bankruptcy*. The patient has overdrawn his nerve bank account, and has depleted all reserve stock of nervous energy. As with a financial bankrupt, it is hard for him to renew his capital. The load of debts and demands absorbs so much of his income that there is but little left for accumulation for future needs. Your neurasthenic has "gone broke" nervously. It is difficult for him to accumulate and store up again for future use a fund of nervous capital.

You must recall that a nerve cell is created for three purposes—to generate energy, to discharge energy, to direct, inhibit, and control energy. These are the three properties of a nerve cell.

An exhaustion depletes a nerve cell, it first loses its third and last acquired characteristic, to wit, the power to direct, control, and inhibit its energy or force, hence it has remaining only its two other properties, namely, the power to create energy and the power to discharge energy, and because the power to direct, control, or inhibit is gone, it discharges its energy practically as soon as created. When

this condition obtains in a large number of the nerve cells of the body you have—neurasthenia.

You can see therefore why it is that we seldom, if ever, have a case of traumatic neurasthenia. The nervousness that results from injury subsides almost as soon as the cause is removed. The only cases that may be called traumatic neurasthenia in the true sense, and they are exceedingly few, are such as those in which we have a large or trunk nerve included in the healing scar of a surgical wound that causes a continuous abiding tugging pain that gradually and insidiously wears down all nerve stability and resistance, making the subject a nervous bankrupt—a neurasthenic in the true sense of the word—with the attendant increased irritability and increased exhaustibility.

There are, I might say in passing, certain physical signs that are constant to a greater or less degree in all cases of true neurasthenia, such as a ptosis of the visceral organ—gastroptosis and enteroptosis—with dilated stomachs that have lost their motor efficiency and gas-filled, distended bowels in which the food ferments and decays rather than digests. Also, there is generally a ptosis of the liver. These ptoses of the viscera are due to the relaxed condition of the supporting and retaining ligaments that have lost their tone, strength, and elasticity because of the increased exhaustibility of neurasthenia. There is also practically always an excess of indican in the urine of the neurasthenic.

PSYCHASTHENIA.

Under the term *Psychasthenia* we, of course, include those cases in which obsessional ideas and obsessional impulses have gained the upper hand in the behavior of the patient. These obsessions are almost as numerous and various as the individuals suffering from this disease. Only the more common types need be referred to. The most frequent are the hypochondriacal obsessions. These make the patients abnormally sensitive in regard to their ailments and extremely egocentric or self-centered. They often focus their attention on certain organs. They are continually diagnosing themselves. If they notice a slight palpitation they form the idea that they have organic heart disease. No amount of reassurance on the part of competent medical officers will relieve them from their obsession. From a slight eczema they are convinced they have syphilis. An inconsequential bronchial cough is interpreted as established tuberculosis, and so on *ad infinitum*.

The terrific phobias are almost endless in number. To paraphrase the poet Lowell:

Some of their hurts you have cured.
And the worst they still have survived.
But what torments of mind they endured
From evils which never arrived.

Fear that the food served will not digest or nourish, fear to venture into the sunlight, fear of touching certain objects, fear of high places, fear of shut-in rooms—you are familiar with all these and countless others.

You can by argument lead most of these patients to recognize that their fears are silly and absurd *per se*, but each maintains that he is unable to resist or control himself in reference to them. The acts that the psychasthenic mulls over in his mind are often repulsive, and he fears he may do such things as commit suicide, make obscene remarks, exhibit himself, or commit some indiscretion in spite of himself.

It is but a short step from this attitude to the true anxiety neuroses, and anyone of these fears if persistent may eventually produce a true psychosis.

HYSTERIA.

Hysteria I would define as a disease of the imagination and the will in which morbid ideas tend to control the body and its functions.

We must distinguish between the disease and its manifestations. The disease hysteria is inborn and innate. The manifestations, however, are acquired and may appear at any time of life when a sufficient amount of suggestion influences the neuropathic organism.

As the saddle nose and other physical defects demonstrate that a patient suffers from congenital syphilis so the hysterical manifestation, whether it be the tantrum or spasm in the child or the contracture of paralysis in the adult, is proof positive that a given patient has hysteria. No amount of stress will cause the real underlying disease hysteria, but the slightest suggestion may evoke any one of the countless hysterical manifestations which we meet among our neuropsychiatric cases. This is important, for from it we know that we can never expect to cure the real underlying disease hysteria, though, with proper insight into a given case, we can readily cure the manifestations no matter what they may be. I think it is well understood that of all the psycho-neuroses, hysterical manifestations are the most readily and most successfully cured.

The latter statement may seem sweeping when we think of the countless variety of manifestations. No other disease is so multi-fold in the variety of its exhibits and symptoms.

Let us briefly refer to them by groups.

(1) *Sensory*.—Anesthesia in some form is one of the most common of all the manifestations met with in hysteria.

It may be in scattered patches or islets, it may occur as a hemi-anesthesia extending from the top of the head to the sole of the foot involving the mucous membranes and organs of special sense on the affected side. The anesthetic area stops sharply at the middle

line and, as in case of the islets of anesthesia, the hemianesthesia exists without regard to the nerve distribution. Again, the anesthesia may be segmental, in which it is limited to one limb or to a part of a limb as in "stocking" or "glove" anesthesia.

Usually the anesthesia is more pronounced after a hysterical paroxysm, i. e. deeper in degree, but it may vary from a mere blunting of the senses to a total loss in the affected area. It may affect all the forms of sensation, tactile, pain, temperature, joint and tendon sense and muscle sense, or it may affect only one of these.

In the realm of the special senses complete blindness or total deafness may occur in hysteria, but this is rare. Usually but one eye or one ear is affected. The blindness or deafness may appear suddenly and likewise disappear with equal suddenness, hence the miraculous cures. If but one eye is affected it can be easily differentiated from organic blindness by the ophthalmoscope and from malingering by the Helmholtz test. If both eyes are affected the patient is more blind than one really blind.

We noticed this in our cases at United States Hospital No. 30 at Plattsburg. The hysterically blind soldier would collide with trees, run into electric-light posts, and bump himself severely, while the really blind patient never does.

Hyperesthesia, though not so frequent as anesthesia, is also an important symptom, and may exist to the degree of painful points on pressure located in the spine, the various joints, over certain ribs, or in the scalp. This gives rise to the term hysterogenic zones. Pressure of these points will evoke almost any train of hysterical manifestations, especially convulsions.

Paresthesia may manifest itself as formication, as flashes of heat and cold or of prickling and tingling.

(2) *Motor*.—The motor group manifestations in hysteria include tremor, incoordination of movements, various paralyses and contractures.

The incoordination may exist either with or without joint and tendon anesthesia and varies in degree from slight loss of control of a few muscles to complete astasia-abasia, inability to stand or walk, while coordinate movements are well executed when the patient lies down or sits.

Tremors may be rapid or slow, or even occur in the intention form.

Paralysis in the hysteric may vary from a single group of muscles to a monoplegia, a diplegia, hemiplegia, or a paraplegia. It may also vary in degree from slight muscular weakness to complete loss of motion in the affected muscle groups. As in case of anesthesia the motor paralysis does not follow the course of nerve distribution, but is purely arbitrary.

As distinguished from organic paralysis, there are no trophic changes.

In hysterical hemiplegia the leg is dragged limply after the patient and not swung around as in the organic cases, while hysterical paraplegia is differentiated from the true organic disease by the practically normal reflexes, the absence of the Babinski toe sign, and the absence of paralysis of the sphincters.

Local paralyses of single muscles, as of the extrinsic muscles of the eye, the larynx, esophagus, or pharynx may occur. The paralysis of the vocal cords, resulting in aphonia, is a good example of such local hysterical paralyses.

All of the paralyses of hysteria are commonly marked by sudden emotional onset, and close observation will reveal that there remain some slight evidences or vestiges of voluntary motor ability, and, of course, the electrical reaction of degeneration is not present.

Contractures are quite common in hysterical cases where there is a more or less prolonged course of paralysis or repeated hysterical motor manifestations. They are usually, though not always, associated with paralysis—the onset is usually sudden, but may be more or less gradual. The contracture may disappear suddenly from one part of the body and just as suddenly reappear in some other part. Usually the contracture will not relax during sleep, but will disappear under an anaesthetic. The deformity produced by the hysterical contracture can readily be distinguished from one caused by organic paralysis.

(3) *The paroxysmal attack.*—This may be manifested by any form of explosion on the part of our neuropathic individual. As Shakespeare puts it:

Diseased nature often times breaks forth
In strange eruptions. . . .

The paroxysm may consist of alternate laughing and crying on the one hand or it may proceed through a state of mild spasm or a mild degree of rigidity, with clonic movements, until we have the major hysterical convulsion as described by Charcot, sometimes called hysterio-epilepsy. The attack may be preceded by marked emotional expressions almost maniacal in character, and even hallucinations may be present. The fit itself may be ushered in by the *globus hystericus* or by visceral disturbances, such as vomiting.

When falling, the hysterical patient sinks to the floor rather than falls, as in epilepsy, and on this account it is rare for injury to result from the epileptoid fit of hysteria. There are usually sighs or groans and sometimes even exclamations are uttered.

On the other hand, the hysterical attack may take the form of lethargy, of somnambulism, or even a trance, which is simply profound lethargy. Such a trance may last for days or even weeks, and while

during such an attack weight is lost, temperature, pulse, and respiration are scarcely, if ever, affected.

(4) *Visceral symptoms*.—The most common of these are vomiting which occurs without nausea, the food being regurgitated without effort, rapid respiration, taking place without increased pulse rate, dyspnoea or cyanosis, the hysterical cough which is persistent, unproductive and bizarre, anuria, polyuria and phantom tumors.

We have reviewed these characteristics of the three cardinal psychoneuroses, for the distinct purpose of discussing the management and treatment of this large group of cases that come to the neuropsychiatric service.

First and foremost, these diseases are psychogenic. They are cortical in origin as distinguished from nervous diseases. While physical causes may reduce the nervous resistance and precipitate the acute symptoms they are fundamentally psychic. Continued duty in the trenches or on board ship with the incident exposure to wet, cold, thirst, hunger, and insomnia produces a condition of fatigue. One of the first effects of profound fatigue is disorientation and the first sign of disorientation is loss of the sense of direction. This ultimately leads to confusional states. Under such conditions we can readily understand why the desire of relief from duty becomes paramount. If a wound be received it may even be welcomed with joy. We all have observed that the reception of a wound will not cause any of the psychoneuroses immediately. The wounded soldier or invalided sailor will bear his suffering with Spartan fortitude; later he enjoys several weeks' rest during convalescence. The pleasant experiences of this period make the return to active service distasteful to him and this thought consciously at first, later subconsciously, permeates his entire being until he becomes a psychoneurotic.

Practically all the psychoneuroses are a sort of complex of defense reactions arising from a desire for relief from what are to him intolerable conditions. This was particularly true of the strictly "war neuroses." I fear it is not so true of some neuroses with which we now have to contend at so great a distance from the time and scenes of conflict. It will soon be four years since hostilities ceased and yet our cases of psychoneuroses are still with us and in increasing number. I regret to say that many of our so-called war neuroses have now been transferred and transmuted into *pension neuroses*, especially among those who never smelled the smoke of battle, witnessed the terrible sights of carnage, lived in the vermin infested trenches, tramped through the oozing bloody mud, floundered in the cold sea after being torpedoed, or experienced the sickening monotony of service on a convoy, mine sweeper, or submarine.

Some of our most deplorable cases of psychoneurosis have occurred in those called in the last draft just before the armistice and at most had but few days of service at a training camp. It is likewise deplorable that the chief thought and topic of conversation of these patients among themselves in our hospitals is the subject of "compensation," and the most persistent "kickers" in our hospitals, those who write their Congressman and cause investigations, making hospital administration so difficult, were the veriest neophytes or tyros so far as actual service is concerned.

The important thing is to get our patients well. If the promise of compensation is held out as paramount in a case of hysteria his condition is prolonged. If it should be decided that there is to be no compensation for the psychoneurotics these diseases would disappear more and more rapidly until our hospitals would have their ranks decimated.

If we can but make a psychoneurotic patient realize that *the best compensation is to get well* we have him headed straight for a cure of his neurosis.

We all have observed in civil life the fact that a person who has alleged traumatic hysteria and brings suit successfully ceases to complain as soon as litigation is over. Those of us who were in neuropsychiatric hospitals in 1918, recall how quickly the majority of war neuroses disappeared a few days after the signing of the armistice. The award of compensation for a purely hysterical disability is a grave mistake.

This leads logically to another phase of the same question. Since hospital treatment is at bottom a form of compensation, does not hospitalization really do the psychoneurotic patient more harm than good? In a number of instances we are forced to admit that the affirmative answer to this question is the true one. In one institution the first case of psychoneurosis admitted over three years ago as a patient is still there. It is believed that he can never be deinstitutionalized successfully.

In point of numbers, the cases of psychoneuroses are by far the largest group of neuropsychiatric patients in our hospitals. They should be extremely few in number if the best results are to be achieved. The report of Doctors Thom and Singer, made after an extended tour of inspection and published in Public Health Service Reports under the date of October 28, 1921, is illuminating on this point.

"In essence, the neurosis is a 'way out' of some intolerable conflict or difficulty. The feelings of stress, apprehension, and worry which belong to the conflict are interpreted by the patient as evidences of disease or injury, the origin of which is referred back to some accident or illness (gassing, influenza, overwork, etc.), of the

more or less recent past. The suffering is genuine and none the less real because the symptoms are ascribed to disease or injury.

"The treatment of such cases must consist in the discovery of the conflict or difficulty, the convincing of the patient as to the real facts, and then his assistance to find some more satisfactory method of dealing with it which is within his capacity. Obviously this must be individual and can not be applied to patients in groups or in a routine way. It requires skill and tact, often with the expenditure of considerable time upon the part of the physician to this one patient. It is, therefore, not surprising to find that the field officer who has many patients to see and no special clinic to which to refer such cases will immediately recommend hospitalization.

"To place such a patient in a hospital is to confirm his belief in the existence of serious disease or damage. Furthermore, it very effectually brings a cessation of the responsibilities and needs for adjustment which brought about the disorder. It is often extremely difficult to discharge such patients and it is a much simpler problem to keep them out of a hospital. No man can be taught to carry a heavy burden by being relieved of the necessity for carrying anything at all. It is true that in some instances the burden may be more than the shoulders can bear. The shoulders must then be trained to bring them to their full strength. If then it be found that the load is too great, steps may be taken to diminish it, but it must not be removed entirely unless we desire to retire the individual from active participation in life."

But inasmuch as we have these patients with us, and properly staffed out-patient clinics are not established, what can we do for them to attain the best results?

The management and treatment of these cases has already been suggested in our description of neurasthenia, psychasthenia, and hysteria.

Since neurasthenia is primarily a fatigue neurosis the treatment, at least in the early stages of the disease when the neurasthenia is profound, must first and foremost be that of *rest*. The Weir Mitchell rest cure has never been improved upon for the acute cases of true neurasthenia. There is no difference between the neurasthenia resulting from mental fatigue and that resulting from physical fatigue. Most of us can remember how this fact was lost sight of in the earlier days of the treatment of this neurosis. The worn-out professional man who was diagnosed as a case of "nervous prostration," poisoned as a result of mental exhaustion, was made to climb mountains and do other exhausting physical work when what he really needed was rest. Fatigue is the result of a poison which has been isolated by chemists and belongs to the crurari group. It produces both mental and physical fatigue.

After the neurasthenia becomes less profound as a result of rest and feeding, there must be well devised setting-up exercises for the purpose of tightening up the loose ligaments, thus ridding the patient of the various forms of visceroptosis. He is then ready for the benefits to be derived from occupational therapy.

The treatment of the psychasthenic is clear from the start. He is a distinct exemplification of the need of the expulsive power of a new idea. You can not cure a psychasthenic patient by entertaining him or sympathizing with him or telling him to forget his obsessions or his phobias. You *can* cure him by causing him to be enthused with a new idea. Our psychasthenic patient is very much like a fellow who has been jilted by his one and only girl. You might seek to entertain him with picture shows, concerts, plays, and similar things for months and months, but he would be the same dejected being. You could not improve his condition by telling him to forget the girl. But if you give him an opportunity to become interested in a new friendship, the new being soon becomes "the only one divinely fair." Note, will you, that the young man did not forget his old flame first and then become interested in the new one; his becoming interested and his forgetting were one and the same act. So, in our treatment of the psychasthenic, the plans should be so perfected that the new interests and the new ideas will crowd out the old obsessions and ego-centric notions. Here is the group of cases in which occupational therapy produces wondrous results by systematically arousing new interests, revealing new capacities, and crowding out the morbid ideas.

As to hysteria, as already stated, its manifestations and symptoms are caused by suggestion. These can be cured by suggestion or persuasion provided the physician has established a feeling of confidence on the part of the patient. The first step in the treatment of hysterical cases is a careful study of each individual. There are no specific formulæ for the cure of contractures, paralyses, tremors, aphonia, psychic blindness, psychic deafness, or other hysterical manifestations. We must first know the patient, his degree of resourcefulness, his limitations, his ability to adapt himself. We must convince him of our ability to help him. Sometimes certain symptoms of hysteria may be created during the neurological examination because of the conduct of the examiner. In analyzing any particular case the medical officer should evidence no surprise, chagrin, doubt, or criticism, but maintain complete self-control with a veritable "poker face." We should always avoid the blunder of treating these psychoneurotic cases as malingerers, no matter how great the temptation may be. This blunder defeats all successful therapeutics in a given case, for the patient at once assumes you do not understand his trouble and hence has no confidence. Inasmuch as a rapid recovery would in-

criminate him as a malingerer he must remain apparently ill to prove the error of the physician.

In the treatment of any neurosis every effort should be made to give the patient a clear understanding of the origin and nature of his trouble. When once the patient becomes convinced there is nothing fundamentally wrong the most important step toward recovery has taken place. Reeducation will do the rest and to me reeducation means *occupational therapy*. Physical culture, in the form of setting up exercises and drill, may serve some purpose but occupation is the best means to the desired end. Non-production occupations should be avoided in psychoneurotic cases. We must treat our patient by first improving his general health to the fullest degree. After this preliminary attention the main line of treatment comprises careful regulation and reeducation of his mental life. We get him away from old habits of thought by showing him their error and at the same time directing his mental activities along new channels.

This reeducation must be skillfully directed and not haphazard. A well planned scheme of occupational therapy systematizes treatment along definite lines. We must always bear in mind the underlying important difference between the purpose of reeducation of psycho-neurotic as compared with orthopedic cases. In the orthopedic case we are trying to make remaining sound limbs capable of taking on the functions and do the work of one that is missing or permanently disabled. With the psycho-neurotic no function should be looked upon as *lost*. It is simply held in abeyance. By occupational therapy we are not *educating* the patient for some pleasant situation, but we are reeducating him for his former tasks no matter how hard they were. We are to impress upon him that we are making him *fit* for the work he put aside when he was called into the service of the Government. No matter how simple the first lessons in occupational therapy are, we must make the psycho-neurotic patient see that it is but the first step and that he is to be led by successive steps until our treatment culminates in full activity and capacity of the pre-war type. In our work of reconstruction we have come to classify our occupations as therapeutic means into three great groups—(1) Bed occupations, (2) indoor occupations, (3) outdoor occupations. Basket weaving, making surgical dressings, net making, sandpapering or polishing the products from the shop are good bed occupations for cases with extensive paralysis or contractures, the preliminary kindergarten step in the process of progressive re-education. Do not permit any patient to think that skill acquired in any of these bed occupations is a substitute for full activity.

The indoor occupations that should be provided might include carpentry, wood carving, metal work and cement work and, where facilities are afforded, printing, bookbinding, electric wiring, and cigaret making.

The outdoor occupations should include farming, gardening, care of stock, building operations, wood chopping.

These outdoor occupations become productive occupations if the patient is permitted to utilize the results of his labor by selling his product after purely business arrangements have been made with the hospital for the raw material used, or for rent of land occupied in gardening, farming, or raising stock.

Care must be taken to prevent any given occupation from becoming humdrum. Neither should it ever be below the patient's ability.

The time is past when theater parties, motor rides, and baseball games accomplish anything for our psycho-neurotic cases. These patients should not be allowed to substitute time-passing pleasures for therapeutic occupations. They must be made to feel that they are merely sojourning temporarily in the hospital, that they are simply being overhauled for full duty later.

A REPORT ON THE USE OF CHAULMOOGRA OIL DERIVATIVES IN LEPROSY.

By C. B. VAN GAASBEEK, Lieutenant, Medical Corps, United States Navy.

In this report of the results of the treatment of leprosy in the Virgin Islands with the ethyl ester derivatives of chaulmoogra oil no claim is made for originality. All credit for the results obtained is due to Doctors McDonald and Dean and their coworkers in Hawaii, who first instituted this method of treatment at the Kalihi Hospital in Honolulu, and whose preparation of the oil we used and whose technic we followed. It is our purpose to show the effect of the ethyl esters of chaulmoogra oil upon the various clinical manifestations of the disease as compared with the same clinical symptoms in some patients who did not take the treatment. At our leper colony on the island of St. Croix, Virgin Islands, for the period covered by this report there were 72 patients, 37 of whom requested and received treatment, while 35 refused treatment. Those who refused treatment did so for religious reasons. They belonged to the Christian Mission Church and believed only in divine healing and refused all manner of treatment, except plain water dressings for their ulcers.

Of those that received the treatment there were 27 of the anesthetic type, 2 of the nodular, and 8 of the combined nodular-anesthetic

type. Of those that refused treatment there were 23 of the anesthetic type, none of the nodular, and 12 of the mixed type.

Treatment was started on February 8, 1921, with the ethyl ester derivatives of the fatty acids of chaulmoogra oil received from Hawaii under the arbitrary title of HI. Since our supply of the oil was limited, we administered it only to those requesting it. We gave 1 c. c. the first week intramuscularly into the buttocks; 2 c. c. for the next three weeks; 3 c. c. for the following six weeks, at which time, April 13, 1921, our supply was exhausted and we were forced to discontinue the treatment until September 7, 1921, when, with a new and large supply of the oil on hand, we were able to begin again. Even with the relatively low number of injections and the small dosage given and the long period of five months in which there was no medication, the results obtained are deemed worthy of note. During the period of injections the patients received tonics, the best food obtainable, plenty of exercise, recreation, and rest and small amounts of chaulmoogra oil in capsule by mouth. It was found that the majority of the patients could not take much oil by mouth and it was difficult to continue the oil in greater doses than one-sixth gramme three times a day. In a large number of cases even this small dosage had to be frequently discontinued for variable intervals and in some to be stopped altogether.

In our series the nasal smear was positive for *Bacillus leprae* in 23 of those who received the treatment. Under treatment the nasal smear became negative in every case. Of those who refused treatment there also were positive nasal smears in 23 patients. Of these latter, 15 have become negative without treatment and 8 are still positive.

The effect of the treatment upon the nodules was truly remarkable. There were 10 patients who had nodules in which the disease had existed from 1 to 9 years. The more marked changes were noticed in those patients having leprosy under 6 years' duration. In 2 of the patients the nodules entirely disappeared; in 5 patients most of the nodules were gone, but a few remained which were comparatively tiny; in the remaining 3 patients the nodules were smaller in size and much softer in consistency. In every case there was evidence of marked improvement. Although the nodules were not directly injected, they could be seen getting smaller week by week.

Of the 12 patients that had nodules and refused treatment there was no change for the better in any of them. In eight there was no appreciable change. In four the nodules were more numerous, harder in consistency, and the skin infiltrated to a far greater extent. In one patient the nodules became so large and numerous that they could not be accurately recorded on the outline figure chart.

The effect of the treatment upon the macules was no less striking. Of those patients taking treatment there were macules present on either the face, body, or extremities in 29. Even after the limited treatment given these disappeared entirely in 12 patients. In 8 patients they became smaller, faded, and approached the normal color of the skin. In 5 patients some of the macules had disappeared while the remaining ones were faded. In 4 patients there was no appreciable change. In 1 patient, at the beginning of the treatment, there were 29 areas of disturbed pigmentation; in January, 1922, there were only 4 areas, and these were small and much faded.

In our experience the duration of the disease had no effect upon the disappearance of the macules under treatment. They disappeared in patients who had had leprosy 2, 10, and 12 years, and remained unchanged in patients having had leprosy 2, 3, 6, and 8 years. In one patient the macules, which had begun to fade, became more evident when she became pregnant. In no patient, however, did the blotchy condition of the skin become worse under treatment.

In the patients who refused treatment there were macules present in 25. During the period of this report they disappeared in 2; remained the same in 16; and became more marked and numerous in 7.

Upon the leprous ulcerations the results were not so striking. This was probably due to the fact that in most of the ulcers there was a secondary invasion by pyogenic organisms upon which the chaulmoogra oil had seemingly no effect. There were ulcers present in eight patients receiving treatment. In four of these the ulcers promptly healed; in one patient the large perforating plantar ulcers became smaller and granulating; while in three patients there was no change.

The duration of the disease did not seem to have any effect upon the healing of the ulcers. Healing seemed to depend rather upon the duration of the ulcer and the extent of the anesthesia. In cases where the ulcers were comparatively recent and the anesthesia slight, there was prompt healing when treatment was instituted. In cases where the ulcers were of long standing and involved bone, and the anesthesia was total, there was no change or, at the most, only slight improvement.

In the patients who refused treatment, ulcers were present in 18. Without treatment 1 healed, 4 remained the same, and the ulcerations in the 13 remaining patients became progressively worse.

The effect of this method of treatment upon disturbed sensation was marked. At the beginning of the treatment there was anesthesia, either slight, marked, or total, in 35 patients. In 6 patients the anesthesia cleared up entirely; in 20 patients there was improvement; while in the remaining 9 there was no change. In those who improved, the areas of total or marked anesthesia became slight, or the

areas of slight anesthesia disappeared. The patients who showed no change or very little improvement were those that had had leprosy for a long period of time, such as for 13, 18, and 25 years.

Most improvement was seen in patients having leprosy less than 5 years, but, improvement was quite marked in those having leprosy less than 10 years. Our records show slight improvement in one patient having had leprosy for 35 years. In no case did the sensory disturbance become worse under treatment.

In the patients that refused treatment anesthesia was present in all 35 cases. Of these, 19 remained the same, while in the remaining 16 the condition became worse either by extension of the areas of anesthesia or by the anesthesia becoming more marked in the areas already present. In no case was there improvement.

Since this treatment was instituted there have been four patients paroled. Two of these patients were entirely free from symptoms, while the other two still had small areas of slight anesthesia. In two of the patients the duration of the leprosy was 3 years, in one 6 years, and in the other 9 years.

None of the patients that have refused treatment have improved so as to be paroled.

The rules that regulate the paroling of the patients provide that they must have at least three successive negative nasal smears and none positive for leper bacilli within the last 6 months; one smear to be taken following a coryza incited by iodides. There must be no open lesions. There must be some improvement in the sensory condition. Nodules must have entirely disappeared. Patients considered ready to be paroled are examined by two physicians who must find them free from any active manifestations of the disease that would constitute a menace to the community should they be released. Under these conditions patients are paroled for two years, during which time they are kept under observation.

There are now seven patients ready to be paroled and one patient who will be ready to be paroled within a few months. Unless there are urgent reasons for paroling patients sooner, it has been considered better to keep them a reasonable length of time so that the maximum improvement might be observed.

Besides the 4 paroled patients and the 8 that can be paroled, improvement was noted in 18 of those receiving treatment. No improvement was found in 7.

On the whole more marked improvement was observed in patients having leprosy less than 5 years, although considerable improvement was found in those of 5-10 years' duration. Those that showed no improvement had had leprosy 6, 8, 13, 18, and 25 years, respectively.

None of the patients refusing treatment improved. Twenty-two remained the same and 13 have become progressively worse.

A few case histories are given to show the effect of the chaulmoogra oil derivatives upon nodules, ulcers, macules, and sensation.

Case 1. H. R.; male; age, 18. Admitted to leper colony March 26, 1915. Three years before admission he noticed nodules on his legs and later on his face and ears, and his hands became swollen. Nasal smears were constantly positive for *B. leprae*. Treatment was started on February 15, 1921. At this time examination showed an advanced condition. His upper eyelids were thickened, his nose enlarged with large nodules on both alae. Part of cartilaginous and bony septum was absorbed. His upper lip was thickened and ulcerated on the inner surface, lower lip was thickened. Tongue was thickened and covered with nodules. Ears were large, thickened, and nodular. Skin over forehead, cheeks, chin, and face generally thickened and gave a leontine appearance. Neck was slightly thickened and covered with nodules. Chest: Upper anterior part thickened and nodular; posteriorly, nodules and blotches present. Abdomen covered with small nodules. Upper extremities: Very nodular throughout, ulcers over both olecranons, all fingers enlarged, ulcer present on dorsum of right hand. Lower extremities: Nodular, skin generally thickened, feet enlarged and show scars of former ulcers.

Sensation: Complete anesthesia of feet and legs as far as knees; slight anesthesia of hands and forearms.

Examination in January, 1922, after treatment, showed the following: Small nodules present on forehead, nose, both ears, lips, and chin; rest of body shows slightly thickened skin where nodules had become absorbed. The leontine expression had gone, ulcers had healed, macules had disappeared, and hands were slightly swollen.

Sensation: Slight anesthesia of face, hands and forearms, feet and legs.

Case 2. J. S.; male; age, 14; admitted to leper colony on October 21, 1919. Nasal smear positive for *B. leprae*. Several months before admission patient noticed macules above right eye. These blotches became larger and patient was sent to this institution. Examination at beginning of treatment on February 15, 1921, showed general discoloration of face with normal skin at irregular intervals. Neck showed 40-50 light patches. Chest, abdomen, and back showed many irregular macules. All extremities showed many macules which were slightly anesthetic. In January, 1922, there were present instead of a couple hundred blotches, only seventeen, and these were so faint that they could be made out with difficulty. His face had entirely cleared up and the nasal smear was negative for *B. leprae*.

Case 3. A. M.; female; age, 40; admitted to the leper colony on October 18, 1918. Treatment was started on February 15, 1921. At this time she had an ulcer on the inner side of her right great toe and a few light-colored areas on the face that merged into one another. Nasal smear was positive for *B. leprae*. Sensation: Slight anesthesia of hands, more on ulnar side and areas on forearms; moderate anesthesia of both feet and of lower half of left leg anteriorly; slight anesthesia of entire right leg and of upper half of left leg anteriorly and entire left leg posteriorly.

In January, 1922, examination showed the following: Nasal smears were negative for *B. leprae*; there were no blotches on face, and the ulcer had healed. Sensation: There was slight anesthesia of both hands, a patch of slight anesthesia on right leg anteriorly, slight anesthesia of both legs posteriorly. On May 6, 1922, there were no ulcers, blotches, or anesthesia and the patient was paroled.

Case 4. W. R.; boy; age, 3½ years; admitted to leper colony on May 24, 1921. A short time before admission there had been noticed light spots on his

face that were slightly anesthetic. Repeated nasal smears were negative. Examination showed well-defined blotches of lighter skin on face and upper and lower extremities. These spots were moderately anesthetic. Sensation: Moderate anesthesia of hands and forearms, slight anesthesia of arms, and slight anesthesia of entire lower extremities. Treatment was started on September 7, 1921, at which time he received one-half c. c. Because of his youth he never has received more than 3 c. c. Up to January, 1922, he had received, besides his initial dose of one 1 c. c., thirteen 2 c. c. doses and two 3 c. c. doses. Examination in January, 1922, showed the spots much smaller and so faint that they could with difficulty be made out. There was no anesthesia.

Case 5. L. C.; female; age, 15; admitted to the leper colony on January 21, 1921. On admission examination showed many irregular macules on face, trunk, and extremities. All of these areas were slightly anesthetic. There was loss of end of right middle finger and flexor contracture of the second, third, and fourth fingers of left hand. Treatment was started on February 15, 1921. Examination in January, 1922, showed that the contractures remain the same, but the macules had quite disappeared. Nasal smears have never been positive.

In order to show the contrast the following case, in which the patient refused all manner of treatment and did not receive the chaulmoogra-oil injections, is outlined. This is an advanced case, but no worse than some of our patients who have received treatment and improved under injections of chaulmoogra-oil derivatives. The progress the disease made in one year without treatment is unusual.

Case 6. L. H.; male; age, 32; admitted to the leper colony March 9, 1910. One year before admission he noticed a light-colored spot on his left cheek. In January, 1921, the nasal smear was positive for *B. leprae*. Examination at that time showed nodules on upper eyelids, nose, ears, lips, cheeks, and neck, chest, extremities, and genitalia. Sensation: Moderate anesthesia of hands and forearms, slight anesthesia of arms and shoulder.

Examination in January, 1922, showed same nodular distribution but nodules were more numerous and larger. Ulcers were present on both feet and left hand. Sensation: That of upper extremity remained the same; slight anesthesia of face and back; total anesthesia of both feet, and anterior surface of both legs; marked anesthesia of right thigh and slight anesthesia of left thigh anteriorly. There was marked anesthesia of both thighs and legs posteriorly.

SUMMARY.

1. Under treatment with chaulmoogra oil derivatives, the nasal smear has become negative for *B. leprae* in every case.

2. In every case presenting nodules there was a marked improvement, and in some cases there was a complete disappearance of the nodules. The less the duration of the leprosy the greater was the effect.

3. In 29 patients with macules there was a complete disappearance of this lesion in 12 and improvement in 13 of the remaining 17. Only 4 did not improve and in these cases the macules became no worse.

4. In 8 patients with ulcers, 4 healed, 1 improved, and 3 remained the same.

5. In 35 patients in whom there was some degree of anesthesia, there was complete disappearance of this manifestation in 6 and in 20 there was improvement. In those who had leprosy of short duration the improvement was more marked.

6. Even with our limited treatment 4 patients have been paroled or 10 per cent of those who received treatment. There are 8 patients to be paroled shortly, making a total of 32 per cent apparently cured.

7. Besides the patients paroled and those to be paroled, improvement was found in 18 others or over 48 per cent, making a total of 80 per cent of the patients under treatment apparently cured or improved.

8. Most marked improvement was noted in patients having leprosy less than 5 years, although improvement was marked in patients having the disease 5 to 10 years.

9. Without treatment, 22 patients remained the same, and 13 became worse. In no case was there any actual improvement.

Our observations have led us to conclude that the ethyl ester derivatives of chaulmoogra oil have a very definite place in the treatment of leprosy. It is believed that they will cure some cases, especially those of relatively short duration, and it is known that they will bring about improvement in a majority of patients to such an extent as to permit their parole. No harmful effects have been observed from its administration.

THE HYGIENIC LABORATORY OF THE REPUBLIC OF HAITI.

By R. M. CHOISSER, Lieutenant, Medical Corps, United States Navy.

The Public Health Service of Haiti was organized and established as a working unit by Commander N. T. McLean, Medical Corps, United States Navy, in October, 1918. His duties at that time were most strenuous and trying. Aside from acting as sanitary engineer of Haiti, whose duties primarily involved the cleaning up of the streets, markets, and cities in general, he had supervision of the civilian hospitals and the compilation of quarantine rules and regulations. Apart from this professional work, he had to deal with the political unrest of the country and the instability of the government at that time. Commander McLean established his headquarters at Port au Prince, and had as assistants four medical officers who were assigned to duty as administrators of the civilian hospitals at Port au Prince, Aux Cayes, Jacmel, and Cape Haitien, respectively, and several hospital corpsmen who acted in the same capacity at the other seaport towns, namely, St. Marc, Gonaives, Port de Paix, Petit Goave, and Jeremie. Lack of funds and the political conditions which existed prevented the inauguration of a

laboratory service for these hospitals and many patients were admitted for treatment in the early days who were later discharged or died without any true diagnosis having been made. It was not until the assignment of Lieut. Commander J. M. Minter, Medical Corps, United States Navy, as sanitary engineer of Haiti in November, 1920, that real progress toward establishment of a modern laboratory occurred. He immediately began to work with this object in view. As it was impractical from a financial standpoint as well as from a lack of trained personnel to establish laboratories at all of the above-named places, Doctor Minter after much endeavor procured an appropriation of \$2,000 from the Department of State of Haiti with which to establish a central government laboratory at Port au Prince. No time was lost after this sum was granted in selecting a site and ordering the necessary apparatus for carrying on general laboratory investigation, including both chemical and biological work.

On November 1, 1921, the equipment had arrived and the writer was appointed director of the new institution with Dr. J. J. Francis, a Haitian physician, as his assistant. It was decided to locate the laboratory at the City General Hospital which was under the direct administration of Lieut. Commander K. C. Melhorn, Medical Corps, United States Navy, whose valuable advice and earnest cooperation has contributed much toward the success eventually attained. Medical officers of the various towns were notified of the establishment of the laboratory, as well as the civilian physicians of the larger cities and all were urged to make free use of it.

Two rooms of the City General Hospital were chosen as a permanent location and the apparatus, which included a large electric autoclave, incubator, centrifuge, drying oven, and water bath, together with microscopes and accessories, microtome, still, glassware, granite-ware, and stains, was soon installed. Before the end of the month specimens of all descriptions began to come in for examination from the various parts of the island. During the first month of operation, a great part of which was spent in setting up the equipment, adjusting the electrical apparatus, preparing media, stains, and various chemical solutions, over 260 examinations were made.

Due to the mountainous condition of the country and the lack of railroad facilities it is difficult to dispatch material for examination in the ordinary manner. However, the United States Marine Corps maintains an aviation station at Port au Prince with landing fields at all of the principal towns of the country, and aviators make trips several times each week distributing mail to the various localities. It is by this means of transportation that much of the material for examination reaches the laboratory.

Special days were designated for certain kinds of work. Mondays and Thursdays were reserved for Wassermann reactions only. Tuesdays and Fridays were set aside as days for the bacteriological and chemical examination of water, milk, and blood, while Wednesdays and Saturdays were used for the routine examinations of urine, feces, sputum, smears, and tissue. Any specimen that required immediate attention was naturally given preference and examined any day.

During the first six months of the laboratory's existence the following number of examinations were made: November, 261; December, 298; January, 553; February, 525; March, 490; April, 476; a total of 2,603.

The bulk of this work consisted of the examination of sputum, urine, both chemical and biological, feces both bacteriological and microscopical, blood smears for the detection of malaria and filaria, together with Wassermann reactions, dark field examinations, chemical and biological examinations of water and milk, tissue diagnosis and the various phases of bacteriological work, such as autogenous vaccines, blood cultures, smears, and Widal reactions.

The examination of sputum revealed tuberculosis to be a rather common infection among the natives. In Haiti this disease is very fatal. This may be accounted for by the natural susceptibility of the black race to tuberculosis and also by the environment of the poorer classes. Out of 117 specimens of sputum submitted from various sources 23 or 19.6 per cent were positive for the bacillus of Koch.

The principal examination of feces was for the detection of intestinal parasites and ova. To date 278 specimens have been examined with a finding of 69 positive or 25 per cent. This, I believe, to be a fair estimate for the entire population of Haiti. The reason for this high percentage is undoubtedly their unhygienic mode of living and eating. The majority of the ova found were those of the nematodes. Ova of ascaris and trichuris trichiura were usually associated in the same specimen, and larva of *Strongyloides stercoralis* were often present. None of the cestodes have been noted, although I have been informed by native doctors that they are not uncommon in Haiti, as evidenced by the passing of the worm itself. It is remarkable, taking into consideration the climatic conditions of the country, and the fact that the bulk of the people go barefooted, that no ancylostoma have been detected. Ancylostoma infection, however, does exist in Haiti, at least in the northern district, as Lieut. Commander G. F. Clark, Medical Corps, United States Navy, the administrator of the civilian hospital at Cape Haitian, reports the finding of seven cases. Jackson in the April issue of the American Journal of Tropical Medicine reports approximately 50 per cent of the popula-

tion of Santo Domingo infested. The fact that Cape Haitian is located on the Dominican border probably accounts for Doctor Clark's findings.

Typhoid fever is practically an unknown disease in Haiti. Since the occupation of the country by American forces in 1915 no typical cases of typhoid fever have been admitted to City General Hospital at Port au Prince for treatment. I have recently conversed with several of the leading Haitian physicians who had received their medical training abroad, and they all inform me that they have never seen a real case of typhoid among the natives. A few sporadic cases, however, have occurred among the foreign element in the past few years, but these are only isolated instances. We have endeavored in the laboratory to isolate typhoid bacilli from some of the cases of fever of unknown origin at the hospital, but cultures from the blood and stools and the Widal reactions have all been negative.

Entameba histolytica, while found widely disseminated through most tropical countries, has not been isolated here. During certain seasons of the year an epidemic of severe dysentery exists in Haiti, and all classes seem to be attacked. During such epidemics special attention was given all stool examinations, with the hope of finding the *Entamoeba histolytica* as the etiological factor, but our results were constantly negative. Similar findings were reported from the laboratory at the Brigade Field Hospital of Port au Prince, as well as from other hospitals and sick bays of the outlying districts.

Malaria is very prevalent, due to the unlimited number of anopheles and to the unscreened, crowded houses in which the natives live. Up to the present time of 285 smears examined 65, or 22.4 per cent, were positive. The types found were benign tertian, quartan, and aestivo-autumnal, the first being the most frequent. This disease seems to run in waves, following closely the rainy seasons, as seen by the figures below:

	Number of smears exam- ined.	Number positive.	Percent- age positive.		Number of smears exam- ined.	Number positive.	Percent- age positive.
November.....	29	13	44.8	February.....	58	11	18.9
December.....	53	18	33.9	March.....	41	4	9.7
January.....	62	24	38.6	April.....	42	5	11.9

When searching for the malaria parasite, we have found the most useful stain to be borax methylene blue, which is prepared and used as follows: Methylene blue 2 grams, alcohol (95 per cent), 100 c. c., 5 per cent aqueous solution of sodium borate 100 c. c. Mix, allow to stand 24 hours and filter. This serves as the main stock solution. Add 10 drops of this solution to 50 c. c. of distilled water

and pour into an ordinary Coplin staining jar for use. When ready to stain, fix the film with methyl alcohol, wash in tap water and immerse in the solution for two or three minutes, wash, blot, and examine. The resulting picture is clear with the various objects sharply differentiated. The leukocytes stain with a deep purple nucleus and a clear cytoplasm, while the erythrocytes take a pale green color. Parasites when present stain purplish black with a brownish tinge to the chromatin granules. Crescents are unusually conspicuous, staining a deep blue with brownish black chromatin dots, and are easily detected among the pale green red cells. This stain has proven to be more useful than the Romanowsky stains as it gives a clearer picture, is more economical, is simple to prepare and is not subject to deterioration from the light or slight acidity.

Yellow fever has not been found on the island, notwithstanding the fact that the *Stegomyia* is very common and can be found in all sections of the country. It is difficult to state whether the *anopheles* or *stegomyia* predominate.

Filariasis is quite common as evidenced by the many cases of elephantiasis seen among the natives and the finding of *Microfilaria bancrofti* in the blood.

Syphilis is unusually prevalent, judging from the results of our Wassermann reactions and dark field findings. It has been customary, as nearly as possible, to make a Wassermann test on all patients admitted to the City General Hospital at Port au Prince, and also a dark field examination of all who presented open lesions on the genitalia. We have consequently run 771 Wassermann tests with a finding of 549 positive or 71.2 per cent.

Inasmuch as Osler states that Haiti furnishes the first historical evidence of leutic infection, it is not astonishing that such a high percentage of positive reactions is obtained. To one who has lived among the Haitian people for any length of time and noted their habits of life, these figures do not seem extraordinary. It is interesting to note, notwithstanding the fact that such a large percentage of the population is leutic, the apparent absence of neurological manifestations of syphilis. It is a rare incident indeed to meet with a case of *tabes dorsalis* or paresis.

Water analyses has been given close attention from the beginning and our results show that practically every specimen submitted revealed gas formers even in high dilutions. This is probably due to the fact that the water for most of the cities is collected from open mountain streams or wells. The water supplying Port au Prince is received from five different sources, only one of which furnishes water potable from a bacteriological standpoint. This source of supply, however, had recently been reconstructed, so that instead of collecting the water from the surface, it was obtained from the deep

springs that supply the stream by means of buried, honeycombed, concrete reservoirs and carried to Port au Prince by large sealed iron pipes. Similar construction is now being undertaken at the other springs and streams with the hope of eventually furnishing a potable water to Port au Prince from all sources.

Tissue examination consists entirely of specimens removed at operation and does not differ materially from that undertaken in any general hospital. Several malignant tumors have been sectioned and diagnosed, but the cases are few and far between. Whether this be due to the fact that cancer is rare in Haiti or to the reluctance on the part of the patients to submit themselves for treatment can not be said.

One case handled at the laboratory was especially interesting and proved beyond a doubt that rabies is present in Haiti. This case was that of a boy who gave a history of having been bitten by a dog 40 days prior to admission. He presented many symptoms of hydrophobia, such as nervous irritability, weakness, difficulty in swallowing, and marked strabismus. He died the day following admittance. Necropsy showed no gross pathological lesions, but sections of the cerebrum demonstrated the presence of Negri bodies.

Fortunately, plague does not exist here. Considering the many ports, the dirty huts in which the majority of people live, and the thousands of rats that infest these places it is not difficult to see how plague would rapidly spread throughout the country in a short time should it get a foothold. As a precautionary measure a rat-catching force has been detailed by the sanitary engineer. One rat out of every 20 caught or killed is sent to the laboratory for examination. These are thoroughly dissected and studied in an endeavor to find some trace of the disease, but as yet no evidence of plague has been found.

While the laboratory is still in its infancy, it is evident from the amount of work already accomplished, that it has proven its value from a public health, as well as a scientific standpoint.

MODELLING COMPOUND IMPRESSIONS.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

Much has been heard recently of tissue atrophy and absorption resulting from wearing dentures constructed after the technic as outlined by the pioneer advocates of the modelling compound impression method. Several years have elapsed since the wave of enthusiasm for modelling compound passed over the country, and now discussions of the merits of this method bring forth usually some statements of unsatisfactory results. These are now ascribed to

excessive pressure or pressure not evenly distributed. When this method was presented to the profession dentures were exhibited in the mouths of patients, which could only be pried loose from the jaws with difficulty, these were considered as examples of the success of this technic.

Next came the wave of clinics and exhibitors with rebasing technics, these were received with great interest, for the impression method, as then advocated and practiced, made rebasing a necessary after-treatment. It was essential that the practitioner have at his command an accurate rebasing technic to take care of the loss of tissue occasioned by tight dentures.

In the light of subsequent investigations it appears that post damming as practiced was to a large degree responsible for failures in retention after the dentures had been worn for varying lengths of time. In other words while a peripheral seal was established which resulted in that sought for "popping" sound when the impression was removed, it made excessive pressure upon the area with consequent atrophy of the tissue. This caused failure of retention within the period of time when it was possible for relief to be effected by absorption of the hard or soft tissues as the case might be.

Dr. R. O. Schlosser, of the Northwestern University, following the technic of Doctors Clapp and Tench, teaches a modification of the modelling compound impression method which has been developed in an effort to get perfect tissue adaptation with full functional freedom.

Tissue adaptation is developed by a series of steps, the completion of each step being the introduction into the mouth of the full impression, with the area desired to be imprinted only, glazed and tempered; thus leaving the remainder of the impression hard, as a guide to insertion and seating, insuring a fine and accurate imprint of the small area which has been softened for the purpose. Failure to get a successful imprint at any step requires merely that that particular step be repeated until successful. The two-step introduction is used exclusively. Compound is traced over the area to be imprinted and the first introduction and seating is made without an effort to firmly seat the remainder of the impression; it is then chilled and removed. With an alcohol mouth torch the surface area desired is glazed, tempered, inserted, and firmly seated, bite relation restored, and the patient goes through certain previously directed movements. After all areas have been successfully outlined and trimmed, either by the muscles or a knife, as indicated by the position of the area, the impression is tested for stability, retention, and full muscular or functional freedom. These being satisfactory, the last steps are the relief of hard areas, relief of the palatine foramen, and the post damming. It will be observed that post damming is the last step and

is made only after all other requirements have been otherwise established. Its purpose is to complete the peripheral seal and not, as sometimes is done, to establish one prematurely. The details determining post-damming requirements and reliefs for hard areas and the anterior and posterior palatine canal foramen will be given.

The patient is directed to say "Ah" with the mouth open, the movable curtain at the posterior of the hard palate is noted, and a mark made at the junction with an indelible pencil; marks are likewise made at the extremities of each tuberosity at the junction of the movable tissue and the three lines are connected with the same pencil. This line gives the junction of the hard and soft tissues in the posterior portion of the vault and the tissues in the vicinity. The position of the anterior and posterior palatine foramen are marked and hard areas outlined. The impression is dried and replaced firmly in the mouth, which act transfers the lines made in the mouth onto the impression, furnishing accurate lines for trimming and reliefs. Black wax, in thickness one-half of the compressibility of the tissue in the vicinity, is placed on the impression as the post dam, a final test is made, which, if satisfactory, completes the impression.

Full functional freedom is a term used to indicate that the impression, and consequently the denture, is not impinging upon surrounding muscle or tissue attachment in such a way as to cause to any degree displacement of the denture upon the normal exercise of these tissues in function. Functional freedom is stressed and apparently receives only the emphasis which is due it; the success of the finished denture, to a large degree, depends upon the thoroughness with which such allowance is made.

To the person unacquainted with the results which are obtainable from muscle-trimming the upper impression and knife-trimming the lower to permit of full functional freedom, it may be said that they are nothing short of marvelous. Firm retention may be developed in lower cases in which the muscle attachment is high, or even on the crest of the alveolar ridge, while greater retention and stability may be obtained for upper cases under extremely unfavorable conditions.

Adaptation to tissues with avoidance of unequal pressure is to be born in mind at all times when taking impressions. Fine imprints and the equalization of pressure are the result of glazing the surface of the compound, yet allowing compound of a lower temperature to support it and carry it gently into the position desired.

Perfect adaptation and functional freedom as exemplified in the teachings of Doctor Schlosser have proven this method worthy of the effort necessary to master it, and the results speak for themselves in the stability and retention exhibited in the finished dentures.

EDITORIAL.

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DIABETES MELLITUS.

Diabetes mellitus deserves the attention of the internist just at present, and this by reason of certain notable and recent additions to our literature on the subject. Joslin¹ considers, in the Shattuck lecture, statistical features and modern treatment. Allen² launches the new *Journal of Metabolic Research* with the results of years of experimental work by himself and his associates, dealing especially with pathology and treatment, and emphasizing the etiological relationship of the islands of Langerhans. And from Canada comes the announcement³ of a clinically efficient extract of the pancreas, containing essentially its internal secretion, i. e., supposedly that from the islets. For this extract and our knowledge of its powers, we are indebted to the intelligence and ingenuity of several coworkers—F. G. Banting, C. H. Best, J. B. Collip, W. R. Campbell, A. A. Fletcher, Hepburn, Letchford, and E. C. Noble—working under the direction of J. J. R. Macleod in the physiological laboratory of the University of Toronto.

We stand, then, in the pleasing position of being able to evaluate accomplishments of the past before entering upon what may prove to be a new era in the treatment of this baffling disease. But it should be ever borne in mind that the new departure has still to establish its claims. Let us keep the checkrein upon our enthusiasm and remind ourselves of the many meteors that have flashed across the therapeutic firmament only to end in obscurity. It may be that we are really in attendance upon the discovery of a fixed star of the first magnitude. The, as yet uncorroborated, reports from Toronto, which Macleod⁴ has stamped with his approval, are most encouraging clinically, but they still require the seal of medical experience, and this can properly be secured only after corroboration from other laboratories trained in such work and from specialists in the treatment of diabetes mellitus. Possibly the diabeticians (if I may be

pardoned), as hopefully expressed so often in their writings, have at last reached their goal—a specific extract that will enable the diabetic organism to properly metabolize sugars. But, until the proper persons have settled the matter, let us not jeopardize the prospects of our patients by radical departure from methods of treatment that have proven their value.

Our pride of achievement rests upon the fact that since 1914 we have increased the average life of the diabetic individual by about 2 years⁵, and, under proper treatment, he may anticipate 5 to 7 years of life—12 years if the disease has been recognized and placed under treatment early. We have lengthened the span of life for children by more than 100 per cent; for the young adult by at least 50 per cent; and the individual developing diabetes mellitus after the age of 40 or 50 years may anticipate the normal expectancy of life. This we owe to the undernutrition treatment advocated by Allen in 1914 and generally adopted since then. The principle recognized by it is that excessive caloric intake can be detrimental as well as can the injudicious consumption of carbohydrate. More recently, Shaffer⁶ has given us the experimental basis for balancing ketogenic (such as fats) by antiketogenic substances (such as carbohydrates) in order to avoid the bane of the practitioner—ketosis with its deadly coma. Woodyatt⁷ translated Shaffer's work into method for use by the clinician. We now base our classification as regards severity¹ upon the reaction to *total* glucose while on a diet of specified caloric and protein value, recognizing the fact that fat and protein, as well as carbohydrate, yield glucose in metabolism.

As regards diet^{1,5,8,9}, we have obtained our results by following the undernutrition dictum of Allen and the demonstration by Joslin of the dangers of abrupt changes. The latter has also taught us that alkalis are of but little moment in treatment. Both advocate diets with high carbohydrate normal fat ratio that preserves a proper ketogenic balance and supply sufficient protein. Other diets, such as that of Newburgh and Marsh¹⁰, have yet to prove their worth.

After the years of speculation upon the internal secretion of the pancreas, its actual preparation is startling in its simplicity. Extract of the whole gland is not only ineffective but also produces untoward reactions. So, degeneration of acinous tissue was induced by means of ligation of the pancreatic duct for 7 to 10 weeks, the result being a replacement of that tissue, while the islets remain unaffected. An extract then prepared is effective. Later work¹¹ indicates that a suitable extract may be prepared from the pancreas of the bovine fetus at about the fifth month, for, at that period, the organ contains no proteolytic ferment. Satisfactory production on a large scale has not as yet been secured, but we may expect an announcement to that effect in the near future.

The extract was tested upon depancreatinized dogs by its promulgators with the most gratifying results. The rabbit is now also used as a test animal. Being thus assured of its safety, seven cases of *diabetes mellitus* were treated by means of subcutaneous injections.¹² Here the results paralleled those obtained with diabetic dogs, and are reported to be (1) marked reduction of blood sugar, even to normal, (2) cessation of glycosuria and ketonuria, (3) a respiratory quotient that indicates increased utilization of carbohydrate, and (4) clinical improvement, both objective and subjective. (C. W. O. B.)

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TREATMENT OF HOOKWORM INFECTION.

Several drugs have been used in recent years in the treatment of hookworm infestations, but with one exception all of them have disadvantages. The exception appears to be carbon tetrachloride, the use of which was advocated by Dr. Maurice C. Hall, of the United States Bureau of Animal Industry, for the removal of worms in animals, in doses of 0.3 c. c. for every kilogram of weight. Thymol and beta-naphthol, except in large doses, are ineffective. Chenopodium is objectionable to many patients; it is frequently followed by depression, and it is necessary for the patient to remain at rest and away from work on the day that the drug is taken; one day's treatment is ineffective with the majority of patients; it is impossible to standardize chenopodium, which contains a large number of chemical agents of unknown composition, and one sample of the drug is often found to be more potent than another; it is dangerous to administer to very young or very sick children.

In suggesting carbon tetrachloride in the treatment of hookworm disease in man Doctor Hall stated that the results would be satisfactory, as almost all worms are removed by one dose without in-

convenience in any way to the patient. Carbon tetrachloride can be manufactured cheaply in a high degree of purity, and the chemically pure preparation is not poisonous in the doses required to remove hookworms. Encouraging reports of the use of this drug in the treatment of hookworm disease in various portions of the world are beginning to appear in medical literature. In the British Medical Journal for July 1, 1922, Nicholls and Hampton report their observations on the use of this drug in Ceylon in doses from 1 to 10 c. c. They had decided to test this drug, especially with a view to the treatment of school children and young children admitted to hospital for various diseases who were also heavily infected with hookworm.

Among various groups of patients treated was one composed of 20 students in an agricultural school, all of whom were infected with hookworm. No purgative was given on the night preceding the administration of the drug. Each student received a dose of 3 c. c. of carbon tetrachloride at 6.30 a. m., before any food had been taken: no purgative was given after the drug was administered. During the day the students carried on their usual mode of life and no restrictions were placed on their work, play, or diet. Not one of them was inconvenienced by the drug. The stools of each student were collected for three days after the treatment and carefully searched for worms. A total of 719 hookworms, or an average of 36 for each student, were recovered, together with 13 *Ascaris lumbricoides*. Two-thirds of the worms were passed on the second day after the treatment. Microscopical examination of fecal specimens 10 days after treatment showed ova of hookworms in only 2 specimens, which indicates that 90 per cent were free of worms.

In another group of 60 worm-infected children, whose ages were from 7 to 17 years, a total of 2,776 hookworms were recovered from 67 stools following doses of 1 to 3 c. c. administered in a small quantity of water. Besides these, 260 ascarids were obtained from 32; 15 trichuris from 6; and 4,945 *Oxyuris vermicularis* from 58 children. Ten days after this treatment an examination of the stools of these children indicated that 88 per cent were free from worms.

The drug was given to a number of young children who had previously been treated with chenopodium on one or more occasions and it was noted that carbon tetrachloride will remove all or a large number of the hookworms which remain after treatment with chenopodium. Likewise, it was found that infested children suffering from pyrexia from various causes and who were anemic and emaciated were in no way inconvenienced by the drug.

From their observations Nicholls and Hampton conclude that carbon tetrachloride is an efficient anthelmintic remedy for hookworms; that the drug may be administered safely in doses of 1 c. c.

to children 3 and 4 years of age, even when they are seriously ill from various causes; that it aids the expulsion of ascarids if it is followed by a purgative, but it is not as effective as chenopodium in killing this worm; that the drug does not deteriorate on keeping.

Carbon tetrachloride is more valuable than chenopodium for campaigns against hookworm disease because patients do not object to its taste; a purge is not necessary; it is more efficient and has not the depressing effects of chenopodium; it is cheaper than any other drug and can be prepared in a high degree of purity and the patient who is being treated can do his usual day's work.

A chemically pure preparation should always be used, as the commercial product contains two very poisonous substances—carbon bisulphide and carbonyl chloride. (W. M. K.)

THE ACETIC ACID TREATMENT OF BURNS.

In recent numbers of the Bulletin there has been considerable discussion relative to the treatment of burns. A study of the literature of burns and their treatment will convince any reader that while much has been written, we are still more or less ignorant of the causes that produce the pathology and altered physiologic functions encountered in cases of superficial burns.

A patient with a moderately extensive burn shows evidence of shock and the systolic blood pressure is reduced. The urine is scanty, highly colored, of high specific gravity and frequently the first specimen shows a faint trace of albumin. The blood picture in the first three or four hours shows a marked increase in the red cells and the leucocytes; coagulation time is decreased in some cases as low as two minutes. A prognosis may often be made from the blood picture. In cases where the red cells are over 10,000,000 and the leucocytes over 50,000 death is imminent.

The constitutional symptoms and the pathological changes which are manifest appear to be caused by toxalbumins which are formed immediately after the burn and appear in the blood stream. The nature of these toxalbumins and their mode of origin is as yet unknown. Their effect might be described as a bio-chemical explosion. Experiments on rabbits show that if the ear is burned, the blood supply having been previously cut off, little constitutional disturbance results, but if the blood supply is left intact and the nerves are severed, severe constitutional disturbance results.

During the war the fact that toxemia in the circulation plays an important part in the production of shock was demonstrated clinically. It was observed that patients admitted to the advance hospitals with severely crushed limbs on which a tourniquet had been applied frequently passed into a state of shock when the constriction

was removed. This fact has been demonstrated on dogs by crushing the muscles of the leg and applying a tourniquet. Shock is delayed until the tourniquet is removed. If no tourniquet is used shock occurs immediately after the injury.

The increase in the blood cells is attributed to a vasomotor paralysis with stagnations of the blood in the capillaries.

The most important pathological finding in the moderately severe burn is a focal degeneration in the lymphatic tissues and in the liver. A mild parenchymatous degeneration of the kidneys can likewise be demonstrated. There are also minute thrombi throughout the viscera, some degeneration of the heart muscle, duodenitis, and even ulcer formation. These processes are due not only to the biochemical explosion which throws toxalbumins into the blood stream when the burn is received but to the absorption of more toxins from the burned areas.

The subject of burns has been extensively studied by Drs. G. M. Dorrance and J. W. Bransfield, of Philadelphia, who contributed the following outline of treatment to a recent number of the *Surgical Clinics of North America*:

"As soon as the patient is received into the hospital, if in pain, a hypodermic injection of morphin and atropin is given, despite the oft-repeated precautionary advice of the textbook against locking up the kidneys with opium. We know that with our forced fluid intake we do not get kidney suppression; at least we do not feel that morphin is contraindicated. The atropin is given to counteract the paralysis of the vasomotor system; 1,500 units of antitetanic serum is given at this time.

"The average patient is in shock; the temperature is subnormal, therefore heat must be applied. If the shock is marked, we put the patient in bed without even undressing him, cover him with heated blankets, and use the electric light cradle, without making any effort to give local treatment.

"When the shock has abated the patient is immersed in a hot saline bath; the clothing is cut away under water so as to float the inner clothing off with as little effort as possible. The temperature of the water should be maintained at 110° F.

"The first dressing consists of one-half of 1 per cent sterile acetic acid. Gauze is not used, but sterilized turkish toweling, which retains the heat and moisture. The dressings are kept saturated at all times. As soon as the patient is placed in bed after the bath and applications of the dressings, 1,000 c. c. of salt or glucose solution is given intravenously; in mild cases hypodermoclysis may be substituted. This is repeated every eight hours if necessary. If the patient's temperature is below 98° F., a cradle fitted up with electric-light bulbs is placed over the bed and covered with blankets. A

special nurse for the first three days is essential in the proper treatment of these cases.

"Water must be given at frequent intervals, and, if possible, a continuous Murphy drip should be instituted. If the location of the burn or other circumstances prevents this, small enemas of tap water should be employed. The keynote of this second step in the treatment is the forced intake of fluids, the purpose being to dilate the toxins in the blood and to stimulate their excretion. The baths are given twice daily after the first 24 hours. On the second day we begin giving liquid petrolatum at frequent intervals, our purpose being to offer a bland soothing substance to the congested lining of the gastrointestinal tract, as well as to promote evacuation of the bowels. We know that on the second or third day we get the secondary absorption of toxins from the burned area, and our efforts are now directed toward preventing this.

"John A. Hartwell, of New York, revived the acetic-acid treatment. He felt this caused a digestion of all necrotic tissue and established healthy, clean granulations. We agree with him, but the acetic acid must come in contact with the necrotic area to accomplish this, hence we devised the scheme of crosscutting the hardened, tanned, charred skin with a safety-razor blade, making the cuts through the entire skin thickness. The cuts are arranged like latticework, thus forming squares 2 by 2 centimeters. Following this procedure we avoid, to a large extent, the reabsorption of this necrotic tissue; the acetic acid almost eats this material and the bidaily bath washes off the excess.

"Acetic acid is a clean, easily obtained material, and we feel it possesses a decided advantage over the picric acid, alumen acetate, carron oil, or any of the ointments. The acetic acid is employed until we have a clear, clean granulating surface. We have been impressed by the fact that we frequently find isolated islands of epithelial tissue under the slough. When the granulating surface covers a large area and skin grafting is necessary, the granulations must be made sterile. We have found that the best way to render this granulating surface sterile is to give the area a good scrubbing with a fairly stiff brush and warm green soap. An anesthetic is often necessary for this procedure in order to do it properly. The bleeding is controlled by moist saline compresses for 24 hours, and then Dakin's solution or dichloramin T is applied. No attempt at skin grafting should be made until you find less than 6 bacteria to the field; the presence of any hemolytic types contraindicates skin grafting.

"We have had more success with the full thickness graft of Wolfe or Krause in these burn cases than with the Thiersch method.

"It is necessary before skin grafting to remove the faint bluish cicatricial edge which is usually found around the margin of the

wound. The grafts should be placed closely together and covered with the usual paraffin mesh; over this mesh we apply a tight saline compress. We feel that pressure on the graft is one of the most important factors in obtaining a 'take.' When the area is small, simple strapping of the granulating surface with strips of adhesive plaster will be sufficient to effect a cure. Occasionally, an area which does not respond to adhesive strapping and for some reason or other skin grafting can not be done, may be treated with equal parts of castor oil and balsam of Peru. This can be used for a day or two; then restrapping the area for 48 hours, and returning to the balsam treatment for another few days. By alternating the various procedures, or using them in combination, most granulating surfaces will respond.

"The question arises that if we are seeking to get rid of the slough, why not remove it surgically or do a *débridement* on admission or a few days later. Theoretically, this would be ideal, but we are dealing with a sick patient, one who, as a rule, is not in condition to withstand either the shock or the anesthetic. In burns of a limited area of an extremity this method or its modification could be employed, but the danger of removing much normal tissue by a *débridement* must be considered.

"Nature is much more conservative with tissue than we are, and unless delay is dangerous it is better to wait until the slough is outlined by its line of demarcation.

"We have used Dakin's solution in some of the milder cases and have had success from the start, but we have not felt it was of value in the extensive burns and scalds outlined above.

"The use of proper apparatus to obtain extension and the keeping of adjacent raw surfaces apart, as in burns of the fingers, is understood. We feel that we may err sometimes in starting too early on these procedures.

"In a very sick patient we should attempt to offer him at all times the most comfortable posture, even though we may obtain a deformity by doing this.

"The early use of cumbersome, painful appliances frequently renders the patient so uncomfortable that we defeat our first purpose by preventing the essential necessary rest and sleep.

"If cicatricial deformities result they should be repaired early. We advise the use of the single or double pedicle flaps. The sliding flaps are not to be used for two reasons: They have a poor blood supply, and their vitality has been interfered with because of their adjacency to the burned area.

"The use of the single or double pedicle flap permits a complete excision of the cicatricial tissue, thus rendering the possibility of cancer formation less.

"Keloids can be prevented by the judicious use of X ray, and scar tissue in the healed area should have light massage early.

"Some of the special types of burns, as sunburn, radium, and X-ray require special consideration.

"The prophylactic treatment here naturally occupies the first place.

"Sunburn can be avoided by the use of acetic acid before exposure to the sun. Apply it liberally over all the parts to be exposed, and permit it to dry on the skin before going out in the sun or water. Following exposure, continuous wet dressings of one-half of 1 per cent acetic acid will, as a rule, prevent the excessive pain. Blistering seldom occurs. The lifeguards obtain their healthy bronzed color by using vinegar. When the burn has occurred we use continuous wet dressings of acetic acid. Morphin is given if the pain is sufficiently severe to prevent sleep.

"When radium and X ray are used in large dosage over a long period of time burns are likely to occur. When treating malignancy one must at times disregard this possibility in order to give any help to the patient. If a dermatitis occurs, dry zinc oxid powder is perhaps the best treatment. If sloughing follows, the slough must be removed and the wound treated by the usual surgical procedures. Because of the frequency with which carcinoma occurs in such type of burns, it is good surgical judgment to completely excise all devitalized cicatricial tissue. The deformity is corrected by the pedicle flap, using a large pedicle or, if indicated, a double pedicle flap. The flap is selected from an area which has not been exposed to the radium or X ray. The experienced surgeon, knowing that flaps will shrink at least one-third of their original size after the pedicle has been cut, is governed by this fact in selecting the area from which the flap is raised." (W. M. K.)

SERUM DIAGNOSIS OF SYPHILIS.

Since 1906, when the paper by Wassermann, Neisser, and Bruck appeared applying the phenomenon of Bordet and Gengou in the diagnosis of syphilis, numerous tests and modifications of tests have been devised for the serum diagnosis of this disease. This multiplicity of tests has no doubt led to considerable confusion in the profession. However, when it is explained that the underlying principle of these tests is essentially the same and that they are merely different methods for determining the same physico-chemical change, it is believed that the subject will be clarified.

For the purpose of comparison, these tests may be grouped under two headings—(1) complement-fixation tests and (2) flocculation tests. The complement-fixation group, of which the Wassermann and the Noguchi, with their modifications, are examples, are so well known that further discussion here is unnecessary. The flocculation

tests, however, are not so well known and a brief description of the development of such tests is considered pertinent.

When it was found that the complement-fixation reaction was not a true antigen-antibody reaction and that the effective substance which reacted with the syphilitic serum was not present solely in organ extracts of syphilitic cases, but also in the extracts of normal organs, and that this alcohol soluble lipoid substance would under certain conditions give a visible precipitate with syphilitic serum, numerous workers started to devise a straightforward flocculation test that could replace the complicated complement-fixation test.

Michealis, Porges, and Meier, in 1907-8, were the first to investigate the practical possibilities of the flocculation method. They used as an antigen a commercial lecithin product made from egg yolk. They discontinued their investigations on account of the instability of the lecithin suspension and occurrence of flocculation with normal serum. Later in 1908, Porges, in collaboration with Elias, Neubauer, and Solomon, resorted to the use of sodium glycocholate as an antigen and claimed that their test in its accuracy approximated that of the original Wassermann test. Since that time we have had methods devised by Browning, Cruickshank, and McKenzie (1910), Herman and Perutz (1911), and many others, until finally the method of Sachs and Georgi (1918), in which an antigen comprised of an alcoholic extract of heart muscle reinforced with cholesterin is used. In addition to these tests in which an organic colloid is used as an antigen, we have many others in which an inorganic colloid is employed.

From a chemical standpoint, it is now pretty well agreed that the basic principle of all these tests is a physico-chemical change brought about by an organic or an inorganic colloid, the former usually called an antigen, which can be so adjusted that it will be flocculated by a syphilitic serum and not by a nonsyphilitic serum. In the flocculation type of test the precipitate can be seen by the naked eye while in the complement-fixation type of test the flocculate is microscopic and determined by means of a hemolytic system.

After all, the important question at this writing is "Which test or type of test now in use has been of proven clinical value?" and the answer may be summarized as follows:

1. The complement fixation type has been found the most satisfactory.
2. The flocculation type, while possessing the advantage of requiring a simple laboratory outfit, a single stable reagent and is time saving, has not proven sufficiently reliable to be depended upon with the possible exception of the Lange colloidal gold test.
3. Until the biological chemist can throw some light on the nature of the so-called "syphilitic antibody" or "Wassermann aggregate,"

or "reagin." and perfects a method by which this substance can be accurately estimated even the best of the present tests will not be entirely satisfactory. (J. H.)

INTEREST SHOWN IN PATHOLOGY BY MEDICAL OFFICERS OF THE SERVICE.

That the medical officers of the service are taking advantage of the diagnostic aid that can be rendered by the tissue pathologist is shown by the increasing number of specimens of tissue received in the past three years by the laboratory of the United States Naval Medical School, and it is reasonable to assume that this increase has likewise been true in many other laboratories throughout the service.

The number of tissue specimens received in this laboratory during the fiscal year ending June 30, 1920, was 235. During the following year the number increased to 344, or 46 per cent. For the fiscal year ending June 30, 1922, the number received was 410, an increase of 76 per cent over that of 1920. Approximately 90 per cent of all the material received was tissue removed at time of operation and a pathological examination was requested for the purpose of corroborating the clinical diagnosis and more frequently to establish a definite diagnosis in cases of obscure nature.

In the past the lack of cooperation between the clinician, especially the surgeon, and the pathologist was due mainly to the delay in receiving a reply on the tissue forwarded to the pathologist for examination, frequently a matter of weeks. This delay was unavoidable on account of the technical methods then in vogue. To-day, however, with the facilities the modern tissue pathologist has at hand, this delay has been shortened to few minutes or at the most a few hours. As an example it may be stated that tissue mailed to the Naval Medical School, if properly fixed in 10 per cent formalin, can be sectioned, stained, examined, and reported on within one hour after the specimen is received.

This applies to all tissue except bone. At present there is no satisfactory short method for decalcifying this tissue and several days are necessary to obtain properly prepared sections.

In an effort to make or corroborate a diagnosis no more hesitancy should be made in enlisting the aid of the tissue pathologist than there would be in consulting the Röntgenologist, basal metabolism expert, or other specially trained medical officer. (J. H.)

TREATMENT OF LEPROSY.

In connection with a report on the use of chaulmoogra-oil derivatives in the lepers of the Virgin Islands which appears elsewhere in

this number of the Bulletin, it is interesting to note the experiences of medical officers in Haiti with this mode of treatment after six months' observation. Although this is a rather short interval of time from which to draw conclusions, a marked improvement in the clinical aspect of the case is reported. The tubercular type responded most rapidly and the nodules in some cases entirely disappeared.

A supply of ethyl esters of the fatty acids of chaulmoogra oil was obtained through the kindness of Surg. H. E. Hasseltine, United States Public Health Service, director of the Leprosy Investigation Station, Honolulu, Hawaii, but this preparation may now be purchased in the open market, being manufactured by a chemical concern in New York. The ethyl esters are administered intramuscularly once a week. An adequate supply of the injection material, needles and syringes is sterilized in an autoclave at 15 pounds pressure for half an hour. A medical officer, commenting on the method of administration, remarks that the patients rather look forward to the "injection day," and, instead of dreading what must be a rather painful performance, all "line up" to await their turn. The site of injection is the upper and outer quadrant of the gluteal region, alternating the sides weekly. Iodine sterilization is used. As an initial dose 1 c. c. is given. This amount is increased by 1 c. c. after every second or third injection until a 5 c. c. dose is reached in adults and 3 c. c. in children.

During the first twenty-four hours following the injections some patients show a variety of reactions. The first to be noticed almost immediately following the injection is dyspnoea and coughing. Many patients experience a sensation of chilliness. A few complain of fever, dizziness, and burning on urination. The appearance, under the skin, of nodules which disappear in a few days, has been noted in a number of cases. Occasionally these nodules persist for weeks.

In addition to the injection of chaulmoogra-oil derivatives the medical officers in Haiti make use of any adjuvant measure which may prove of value. For the old indolent ulcers and chronic eczematous areas ammoniated mercury ointment has been found satisfactory. Trichloracetic acid seems to produce a beneficial effect when applied to nodular thickenings which do not respond rapidly to treatment, but in the Negro this treatment is apt to produce hyperpigmentation. Injection of the nodule with the ethyl esters has been employed in a few cases, but the external application of trichloracetic acid seems to give better results.

For those interested in the modern treatment of leprosy the United States Public Health Service Reprint, No. 607, on the "Treatment of Leprosy," by McDonald and Dean, will prove most helpful and instructive. (W. M. K.)

CLINICAL NOTES.

REPORT OF AN UNUSUAL OCCUPATIONAL INJURY.

By J. C. PRYOR, Captain, Medical Corps, United States Navy.

The following is reported because it appears desirable to invite attention to an occupational injury which may be observed occasionally by medical officers in the naval service.

On April 25, 1922, while repairs were being made on the U. S. S. *Henderson* at the navy yard, Norfolk, Va., some buckled division plates were removed from her smoke pipe. The smoke pipe is divided into three uptakes or channels conducting smoke and gases from the fuel-oil burners under boilers Nos. 1, 2, and 3, respectively.

L. E. S., a civilian boilermaker who had been working in the smoke pipe, came hurrying to the dispensary in much discomfort, showing irritation of skin, conjunctiva, and respiratory mucosa. The irritation amounted to painful burning (first degree) principally on the exposed parts of the body, but also to a lesser extent on parts of the body not exposed.

The man was covered with soot, and it was noticed that the back of his overalls, shirt, and undershirt had literally fallen out. His back was bare. A shower and alkaline bath were immediately prescribed.

Following the bath he was in a state of erythema, which was scarlatiniform on his exposed back and on areas not covered by clothing. He progressed to uneventful recovery.

The following information was obtained concerning the case. He had been lowered in a boatswain's chair into the middle uptake of the *Henderson's* smoke pipe, in order to remove division plates. In descending, the clothing on his back had been thoroughly rubbed against the soot in this uptake. The middle uptake or subdivision of the smoke pipe in which he was working was the uptake from the burner under boiler No. 3. The fire under this boiler had been extinguished two days previous to the occurrence being described.

L. E. S. noted the increasing discomfort when he came out of the uptake, and reported immediately to the dispensary for treatment.

The symptoms of the man, and the effect upon his clothing, indicated the probable presence of corrosive acid in the soot.

Portions of his clothing were taken, a specimen of the soot on walls of the middle compartment of the smoke pipe in which he had

been working, and a specimen of the fuel oil was also obtained from the feed line at the burner under boiler No. 3.

Chemical analysis of the fuel oil showed the presence of 2.25 per cent of sulphur. It is understood that the maximum sulphur content allowed in the specifications for Navy standard fuel oil is $1\frac{1}{2}$ per cent.

Chemical analysis of the water in which the specimen of clothing had been boiled gave strong qualitative reaction for sulphuric acid. Chemical analysis of the soot residue from No. 3 uptake showed the following result:

	Per cent.
Silicon dioxide (SiO_2)	1.79
Oxide of Iron (Fe_2O_3)	6.64
Sulphuric acid (H_2SO_4)	35.71
Carbon (C)	55.86
Hydrochloric acid (HCl)	Trace.
Nitric acid (HNO_3)	None.
	100.00

From the foregoing analyses it seems reasonable to assume that the sulphur (greatly in excess of the amount allowed for Navy fuel oil), when burned under boiler No. 3, formed sulphur dioxide gas (SO_2), that it was further oxidized by the warm air in the smoke pipe to sulphur trioxide gas (SO_3), further by absorption of moisture (H_2O) became converted into sulphuric acid (H_2SO_4), and had impregnated the specimen of soot examined in a sufficient degree to show the presence of 35.71 per cent of sulphuric acid. The above analysis shows only a trace of hydrochloric acid, and no nitric acid.

The fires under boilers No. 1, and No. 2, had been extinguished for at least two weeks and it is believed that during that time the considerable rain and high relative humidity had diluted the sulphuric acid (H_2SO_4) in the uptake from burners No. 1 and No. 2 to such an extent as to render it innocuous to the men who worked in uptakes No. 1 and No. 2.

The burner under boiler No. 3 had so recently been extinguished that dilution of the sulphuric acid (H_2SO_4) by atmospheric moisture could not have taken place to the same degree.

In view of the steadily increasing use of fuel oil it appears to be desirable, (a) to adhere strictly to the Navy specifications concerning the sulphur content of fuel oil; (b) to take precautions to prevent accidents similar to the one above described in case of men entering uptakes to work.

The above-described injury is the first of its kind which has come to the observation or knowledge of the writer.

An examination of such meager literature on occupational diseases and injuries as has been available has failed to discover a description of injury similar to the one above described.

If coal burned, especially in London, contains high sulphur content may not continued irritation from sulphuric acid be a possible etiological factor in the production of chimney-sweeps' cancer?

SMALLPOX VACCINATION ABOARD THE U. S. S. "MISSISSIPPI."

By F. G. ABEKEN, Commander, Medical Corps, United States Navy.

As the result of experience during a smallpox epidemic the following routine for vaccination has been adopted on board the U. S. S. *Mississippi*:

Every man reporting on board for duty shall have his health record examined for positive entries during his current enlistment and the scars noted. also the statement of positive vaccination noted in the health record shall be verified by an examination of the man. Where the entry is positive the man will be vaccinated with a vaccine of known potency and *the presence of an immune reaction determined*: In case an immune reaction is not exhibited, the entry shall be considered as negative and the man shall be vaccinated. The routine for negative vaccination will be a series of three vaccinations every six months unless a positive or immune reaction is obtained.

From February, 1921, to July, 1922, there were 3,848 men vaccinated for the prevention of smallpox, in which 96.2 per cent gave a reaction of immunity. 2.5 per cent a reaction for vaccinoid, and 1.3 per cent a reaction for vaccinia. It is of interest to note that there is a close correlation between the percentages of vaccinia reaction (1.3 per cent)—those having had no immunity—and the percentage of cases (1.5 per cent) that developed smallpox on board ship in February, 1921. It will also be noted that 3.8 per cent of the number vaccinated comprised those whose immunity had completely disappeared or whose relative immunity was low. This large percentage of nonimmunes or low immunity is attributed to want of any definite formula in the naval service for arriving uniformly at a positive interpretation of the results of cowpox vaccinations. A formula adopted and pursued on board this ship with satisfactory results is as follows:

Properly performed vaccination (scarification 2 mm. diameter) will result in one of three typical reactions.

1. *Vaccinia*.—In previously unvaccinated persons, or in those whose immunity has completely disappeared, a papule should appear at the site of inoculation on the fourth day following the vaccination. On the fifth day, a discrete circular vesicle, about 5 mm. in diameter, makes its appearance and is surrounded by a *narrow areola*. This vesicle increases in diameter at the rate of a millimeter a day until about the seventh day when the skin outside the areola begins to turn red, the axillary lymph nodes become swollen and

tender, and fever with headaches may be present. This *area* of redness rapidly extends until the tenth day, when the redness quickly spreads to about 50 mm. in diameter, followed by rapid drying of the vesicle and scab formation, the latter loosening about the twenty-first day and leaving a permanent pitted scar of about 10 mm. in diameter.

2. *Vaccinoid*.—A milder form of vaccinia occurs in those whose relative immunity is somewhat low, either through previous vaccination, or an attack of smallpox. This reaction exhibits itself as a *smaller* vesicle with a large areola on the *fifth day*. Its duration is shorter and the resulting scar smaller than in a true vaccinia reaction. The maximum reaction occurs between the fourth and seventh day. This form of reaction is sometimes called "the accelerated reaction."

3. *Reaction of immunity*.—If the immunity is very high, either from a previous vaccination or from an attack of smallpox, a subsequent attempt at vaccination results in a prompt, sharp reaction, that consists only of a papule with its maximum diameter occurring in from 12 to 60 hours. In this case there is neither vesicle nor areola, and the reddened papule at the inoculation site fades out by the fourth day. This reaction is designated "the reaction of immunity," or, as it is sometimes called, "the immediate reaction."

Any of the three foregoing reactions indicates that the maximum amount of immunity has been produced in the individual. The time element is an important factor in deciding upon the type of reaction. Furthermore, it must be remembered that if the papule and areola do not appear until the *third day* and *there is no vesiculation*, the reaction is not one of immunity but is due to either an inert virus or to a failure to inoculate properly.

As a routine procedure every man who is vaccinated is required to report on the second, fifth, and tenth day. If there appears to be any difficulty in determining the type of reaction, then the man is requested to report more frequently.

At each examination the result of the vaccination is recorded in a book by checking on the following diagram:

Name.	Rate.	Reaction of immunity.	Vaccinoid.	Vaccinia.
		1 to 3 days.	4 to 7 days.	8 to 11 days.
Doe, J. E.	Cox.	(?)	Successful ...	
Lowe, T. O.	WT-1 c.	(?)	(?)	Successful.
Smith, J. O.	SF-3 c.	Successful...		

Unsuccessful cases are revaccinated and again recorded in the book on a new line as a fresh case.

The nomenclature of the above three typical reactions is used in making permanent entries into health records of all successful small-pox vaccinations.

In pursuing the doctrine as expressed in paragraph 2 and in applying the formula of one of the three typical reactions for successful vaccinations, it is noted that not one case of negative vaccination was recorded out of the total 3,848 vaccinated cases.

The method of vaccination as employed on this ship is as follows:

The skin is cleaned at the deltoid insertion with alcohol or sterile water and rubbed dry. The operator grasps the patient's arm with his left hand encircling the arm and drawing the skin very tight at the selected site. The sharp end of a straight dental chisel with a 2 mm. edge, previously sterilized by passing through an alcohol flame, is held against the skin, and, by a quick, rotary motion, a small, circular plug of epidermis is cleanly removed, exposing the derma and drawing serum but not blood. Three of these scarifications are made at points situated on a line but not closer together than 2.5 cm. The contents of the capillary tube is now expelled upon one of the scarified points and is transferred to the other two and rubbed in by means of the chisel. The inoculated site is allowed to dry, but not by exposure to the sun. No dressing is applied.

The accompanying photograph illustrates the three types of reaction for successful smallpox vaccination.

EFFECT OF CARBOL-FUCHSIN STAIN ON DISEASES OF THE GINGIVAE.

By H. A. DANIELS, Lieutenant, Dental Corps, United States Navy.

The attention of the dental profession has recently been turned toward the marked increase in diseases of the gingivae, ranging from simple gingivitis to extensive development of acute ulcerative type (Vincent's angina)—conditions which occupy no obscure position on the monthly returns of the naval dentist.

It is worthy of mention that of the first 30 patients each month to report for dental treatment at the naval air station, Pensacola, Fla., for the past 12 months, an average of 9 were cases of gingival disturbance, or 30 per cent of all recorded cases for which treatment was required. It has been the observation of the writer that similar conditions prevail in various localities in the service, these cases varying in number from time to time, but steadily increasing in periodical average.

However limited this field of observation may have been, it is reasonable to suppose that a like opinion prevails among dental

officers in various assignments and under similar working conditions. In such cases it is frequently difficult to effect a speedy cure. It is not an unheard-of procedure to treat for months, between intervals of "cures," a stubborn case of gingivitis or pyorrhoea. Probably all of us have experienced this embarrassment at one time or another, and to that end this article on the therapeutic properties of carbol-fuchsin stain in diseases of the gingivae has been prepared.

The use of carbol-fuchsin stain in the above conditions is not a discovery or an original experiment of the writer. It has enjoyed a high reputation and extensive use in the medical profession for some time past, but inasmuch as little has been written on the subject, a brief description of its value in dentistry may not be untimely.

In the employment of carbol-fuchsin stain on the gingival and oral tissues all deposits about the necks of the teeth should be removed and the tissue cleansed and dried. The stain should then be applied, care being taken to cover thoroughly all interdental spaces and cause it to flow as deeply as possible into such spaces about the teeth. The stain is then dried by blasts of warm air.

This should be done at least three times daily in cases of acute ulcerative gingivitis, and not less than once daily in milder types, such applications to be assisted by home treatments of antiseptic mouth washes. In the latter treatment the dentist must make his own choice, checking the result in accordance with the greatest susceptibility to the remedy of the individual case. This treatment has been found very effective, and will often bring about a complete cure in the most obstinate cases in a remarkably short period. Acting in its capacity of a basic stain, carbol-fuchsin stains and kills the invading germ within the tissue as on the laboratory slide, a little time being required to extend its staining power into the underlying tissue. When this objective has been gained the result will be quickly noticed by the rapid return of the affected part to normal color and firmness.

TWO INTERESTING ABDOMINAL CASES.

By A. L. CLIFTON, Lieutenant Commander, and F. R. HOOK, Lieutenant, Medical Corps,
United States Navy.

The following two cases treated on the surgical service of the U. S. S. *Relief* are being reported on account of the extreme difficulty and, in fact, inability to make correct diagnosis previous to operation.

Case No. I.—G. W., F-2c.; age, 20; white, native of Indiana. Was transferred to this ship from the U. S. S. *Wyoming* on March 10, 1922, with a diagnosis of appendicitis acute.

Family history: Negative, except that father died from pulmonary T. B.

Past history: Usual diseases of childhood. Influenza, complicated by pneumonia, in 1918. Acute cholecystitis four years ago.

Present trouble: About one month previous to admission began having cramping pains in upper abdomen. These pains at first were more or less generalized and came on after eating, and were partially relieved by bowel movements. Pain was aggravated by being on feet, but did not get complete relief by lying down. For two weeks this pain remained about the same, but he was able to continue at his work. Was on no medication during this period except mineral oil. About one week ago pain became more marked and localized in the right lower quadrant. Was turned in at the sick bay and diet restricted. Under this treatment he did not improve; in fact, pain became worse, and was especially severe after taking food or moving about in bed. Could get relief only by lying on right side. At no time did he complain of nausea or vomiting.

Physical examination: Patient is somewhat undernourished, apathetic, does not appear to be suffering. Head and chest are negative. Abdomen is flat, and there is slight tenderness and muscular rigidity over the appendical area. No palpable mass is demonstrable. Temperature, 100° F.; pulse, 108; respiration, 18; leucocytes are 8,250.

Was put to bed, given liquid diet, and a hot-water bottle to abdomen. Nurse reports on this date good results from a soapsuds enema. Patient was kept under observation for one week and temperature during this period was normal except on two occasions, when it reached 99.4° F. Repeated urine examinations were negative and the leucocytes had dropped to 7,100. Had had no voluntary bowel movements, but good results were reported from soapsuds enemas daily.

As pain and tenderness had practically subsided on March 17, 1922, an interval appendectomy was considered advisable. Was given gas-ether and a gridiron incision made. On opening the peritoneum a normal-appearing appendix presented itself. There was some free serous fluid in the peritoneal cavity. A mass about the size of a large hen's egg was found in the right iliac fossa which, when delivered through the abdominal incision, proved to be an intussusception of the terminal ileum through the ileo-caecal valve. An attempt was made to reduce this deformity but it was of no avail on account of the marked oedema and induration present, so a lateral anastomosis was performed between the ileum and caecum and the ileo-caecal valve with about three inches of the terminal ileum was resected. Chromic gut was used throughout. The appendix was then amputated. The lumen of the gut at the intussusceptum was approximately one-half cm. in diameter and the mucosa was markedly oedematous and congested.

The patient was given continuous proctoclysis following the operation and reacted well. Convalescence was rapid and uneventful. Required one hypo of morphine sulphas gr. 1/6 the night following the operation on account of pain in abdomen. Was taking liquids on the second day and passing gas by rectum. An enema was given daily until the eighth day, when the bowels moved voluntarily. Was out of bed on the tenth day and bowels were moving regularly without the aid of enemas or cathartics.

This case to us was very interesting and instructive. Undoubtedly this condition had existed for approximately one month previous to operation but the lumen of the gut had not been constricted to such an extent as to cause the classical symptoms of intestinal obstruction. Our failure to diagnose the case previous to operation was undoubtedly a distinct advantage to the patient, as it gave him the privilege of an early resection, while still in good condition.

The second case is also interesting from a diagnostic standpoint.

Case No. II.—W. A., C. W. T.; age, 34 years; white; was transferred to this ship from the U. S. S. *Wyoming* on February 9, 1922, with a diagnosis of chronic appendicitis.

Family and past history: Of no importance.

Present trouble: About six weeks ago began having a dull aching pain in right lower quadrant. Was doing patrol duty at the time and could not stand the weight of a web belt on his abdomen. Was put on light duty and got along fairly well as long as he took two compound cathartic pills daily. Four days ago awoke in the morning with severe pain in the right lower quadrant. Had no nausea or vomiting and got relief after taking a cathartic. Has had no urinary symptoms.

Physical examinations: Patient is well nourished and does not appear to be acutely ill. Head and chest are negative. Abdomen is soft and in the right lower quadrant there is a palpable mass about the size of a tennis ball. This mass is firm, smooth, and movable to a certain degree. It has not, however, the contour or free mobility of a floating kidney.

On admission temperature was 99.6 F., pulse 112, respiration 24. Leucocytes were 12,800. Urine was negative. Blood Wassermann was negative. Temperature continued to fluctuate between 97 F. in a. m. and 99 F. in the p. m.

Patient was given a barium enema which revealed an apparent obstruction to the opaque fluid about 5 cm. above the caecum. A pyelography was then done on the right side to rule out movable kidney. This showed the kidney to be normal in size and in its proper position.

A tentative diagnosis of new growth arising from the caecum was made and an exploratory laparotomy performed. A mass about the



A CASE OF MALNUTRITION BEFORE TREATMENT.

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THE SAME CASE AFTER ONE MONTH'S TREATMENT.



AFTER FOUR MONTHS' TREATMENT.

size of a large walnut was found in the right iliac fossa which proved to be a chronic appendix entirely enclosed in a mass of adhesions between the caecum and small intestine. The appendix was dissected out and amputated in the usual manner. Convalescence was uneventful and the patient returned to duty within a month's time.

REPORT OF A CASE OF MALNUTRITION.

By D. HUNT, Lieutenant Commander, Medical Corps, United States Navy.

One of the greatest problems of the Medical Corps of the United States Navy in American Samoa is that of malnutrition. John Williams, a missionary who settled in Samoa in 1830, stated at that time that he believed that at least two out of every three babies born in Samoa died during the first few years of their lives. From the best information obtainable in regard to the infant mortality in American Samoa in 1900, when the administration of the islands of Tutuila, Ofu, Olosega, and Tau was taken over by the United States Navy, it is believed that one out of every two babies born died principally from malnutrition and its sequelae. To-day the infant mortality compares favorably with that of the United States, yet it should be much less, due to the absence of all febrile contagious diseases (measles, scarlet fever, diphtheria, etc.) in American Samoa. During the past year every family has been furnished with an article printed in the Samoan language on the "Care and treatment of babies." The personnel of the Samoan Hospital and the outlying dispensaries are fully instructed in the preparation of milk formulas from fresh milk, canned milk, and powdered milk, and the dispensaries are so located that they are accessible to all Samoans. The sanitary inspectors and visiting nurses are also instructed in infant feeding and they visit each village at least twice a month. In addition propaganda is being carried on with a view to educate the Samoan people in the proper method of caring for babies and to discourage the harmful Samoan practices.

The subject of this report was admitted to the Samoan Hospital February 7, 1922, with the following history: Two years old. Mother states that the child weighed about 9 pounds at birth and that labor was normal. Was breast fed for three months and gained regularly during this time. No apparent reason for weaning the child. After weaning was given Samoan food such as coconut milk, papaya soup, banana soup, and breadfruit. Gradually began to lose weight. Many Samoan medicines and treatments were tried without any improvement. A few months ago developed yaws and ringworm.

On admission weighed 7 pounds, was running a starvation temperature, skin was dry and shriveled, eyes were glassy, was suffering

from yaws and ringworm in addition to malnutrition. The child looked like a mummy (see illustration). Owing to the critical condition of the child no attempt was made to treat the yaws, in fact such treatment was impossible, as there was not enough tissue available to make a safe intramuscular injection. The child was placed on proper milk formulae.¹

At the end of one month the child weighed 9 pounds (see illustration). The yaws cleared up immediately after injections of neoarsphenamine. The ringworm responded to treatment.

Under proper supervision and care she has gained regularly 2½ pounds each month and now at the age of 2 years and 4 months weighs 16 pounds (see illustration).

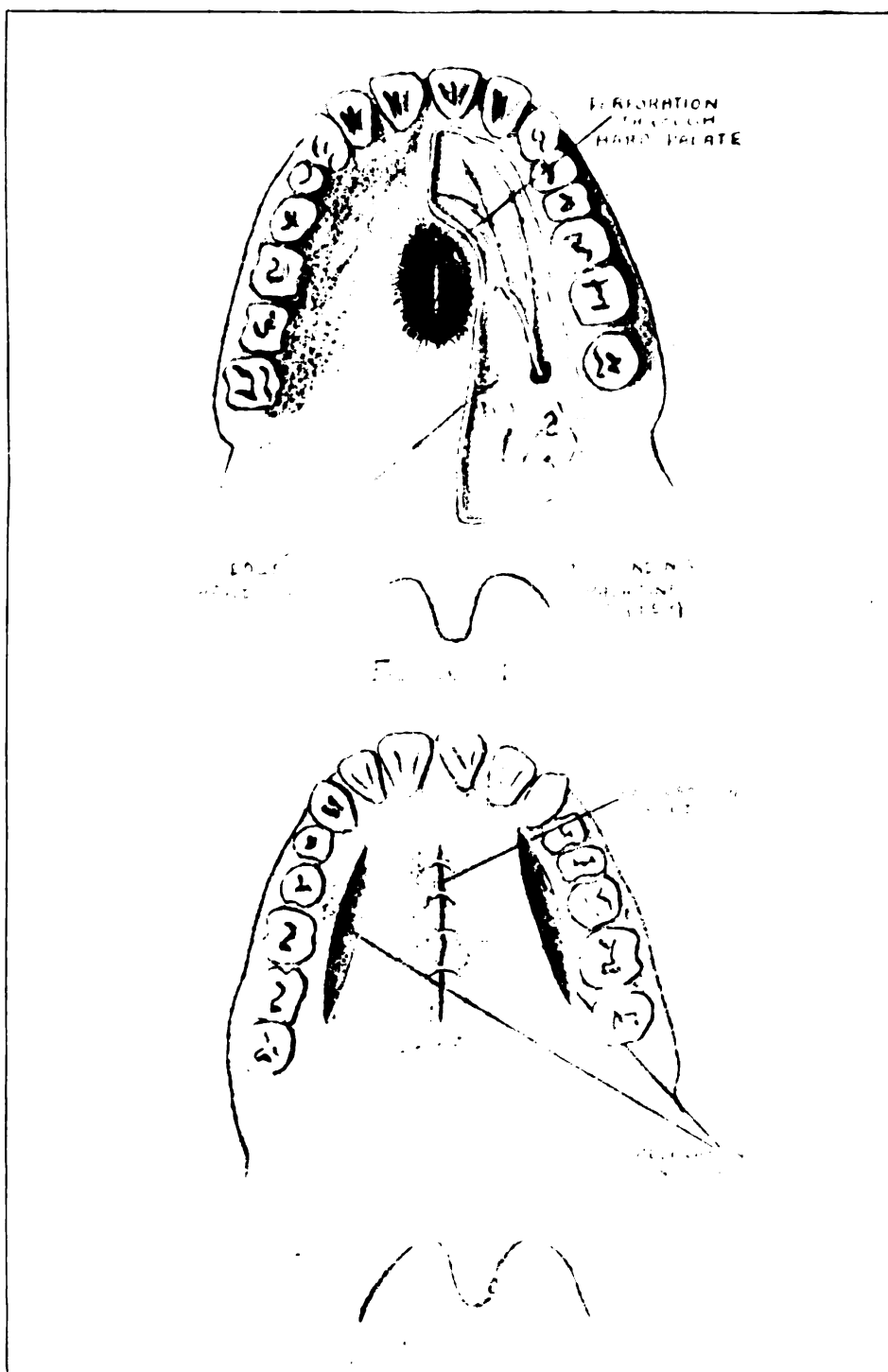
LUETIC PERFORATION OF THE HARD PALATE WITH SURGICAL CLOSURE.

By F. E. LOCY, Lieutenant, Medical Corps, United States Navy.

While luetic perforations of the hard palate are frequently left untreated or are partially relieved by prosthetic apparatus, they may be easily and permanently closed by surgical means in those cases where the active infection in the bone has subsided. In the case herein reported the first attempt at closure, which was by means of a transplanted lower turbinate bone, resulted in failure, but a second attempt, using sliding flaps from the sides was successful in closing the perforation.

P. F., a negro of 30 years of age, had a chancre in 1915, which received only local treatment. In 1919, following Army service, he first noticed a foul blood-tinged discharge from the nose, which was followed by a perforation through the hard palate. The perforation enlarged until it caused difficulty in swallowing and talking distinctly. On admission to the United States Naval Hospital, Great Lakes, Ill., on May 13, 1921, as a Veterans' Bureau patient, he had a large perforation through the base of the nasal septum, which extended down through the hard palate into the mouth. A sequestrum which was visible through the mouth partially closed the defect. The general nutrition of the patient was poor, a foul penetrating odor emanated from the nose and mouth, the Wassermann reaction was positive and the pupils reacted sluggishly to light, but the physical examination was otherwise negative. He was sent to the genito-urinary ward for antisyphilitic treatment. In April, 1922, after several negative Wassermann reactions, he was transferred to the ear, nose, and throat service. At this time the sequestrum had entirely loosened and it was removed on April 11 through the mouth by slightly enlarging the perforation in the palate. This measured

¹ The Samoan Hospital maintains a small dairy.



OPERATION FOR PERFORATION OF THE HARD PALATE.

roughly five-eighths of an inch in diameter and consisted of greyish-white soft spongy bone. On April 24, after daily cleansing and antiseptic treatment of the nose and mouth, an attempt was made to close the perforation of the hard palate by transplanting the anterior tip of the right lower turbinate bone. The turbinate nearly filled the defect and remained alive, but after repeated trials no union was obtained between it and the tissues of the palate. The failure was probably due to the large amount of muco-purulent secretion which came down from the nose, rather than to a fault of method.

On June 15 the patient was again operated upon using a different method which resulted in success. The turbinate, while still visible from the mouth, had by this time so atrophied that its tip was on a level with the floor of the nose and it was therefore left in place. Excellent anesthesia was obtained by cocainizing the sphenopalatine ganglion and the anterior ethmoid nerve and injecting a small amount of 1 per cent procaine solution just anterior to the opening of the posterior palatine canal. Relaxation incisions were made in the mucous membrane through to the bone on both sides of the perforation, parallel to but not exposing the roots of the teeth from the cuspid to the second molar. These incisions were beveled inward from the surface so that when they were spread the underlying bone would not be exposed. A semisharp Freer's nasal mucous membrane elevator was introduced between the bone and the periosteum and the soft tissues were dissected up until the elevator appeared in the perforation. The greatest care was employed to avoid what would have been troublesome hemorrhage during this procedure by not injuring any of the large branches of the descending palatine artery as they coursed through the elevated tissue. (See Fig. I.) When the elevation of the flaps was complete the edges of the perforation were pared with a cataract knife and approximated without difficulty by four silkworm gut sutures. (See Fig. II.) Following the operation the patient was not allowed to talk or eat solid food for two weeks and the nose was irrigated daily with normal salt solution. The relaxation incisions filled in rapidly by granulation without treatment. The sutures were removed on the eleventh day. Firm union had taken place and the patient was discharged from the hospital four weeks after the operation.

REMOVAL OF AN ORGANIZED OTHEMATOMA.

By F. E. Loeck, Lieutenant, Medical Corps, United States Navy.

While fibrous growths in the ears following trauma are not unusual, the case herein reported may be of interest on account of the size of the deformity. A. H., a Veterans' Bureau patient, was

admitted to the neuro-psychiatric service of the United States Naval Hospital, Great Lakes, Ill., on January 5, 1922. He was 30 years old, a Syrian by birth and a wrestler by occupation. Since childhood he had devoted himself to wrestling. Due to repeated trauma to the ears followed by othematoma, he had developed hard fibrous masses beneath the skin of both auricles. This was most marked on the left side where a tumor almost the size and shape of a small hen's egg was present in the concha. The patient desired removal of the growth and he was transferred to the ear, nose, and throat service where I operated on him on February 16, 1922. Under local anesthesia an incision was made starting anteriorly just above the tragus and extending upward along the edge of the helix and down posteriorly nearly to the lobule so that a tongue-shaped flap was marked out. The skin of this flap was then carefully elevated from the thickened tissue to which it was tightly adherent, then the mass was dissected free from its attachments internally and removed. A few thin slices of fibrous tissue were left attached to the skin to give a little stiffness to the ear. On removal the mass weighed 12 grams and was 37 by 26 by 18 millimètres in size. The tongue-shaped flap was trimmed to fit into the space where the tissue had been removed and the raw surfaces were approximated. The edges were then sutured with fine silk in a slightly inverted position to more clearly outline the edge of the helix. Damp cotton was then placed about the ear in such a way as to mold it into as nearly normal shape as possible during healing. In spite of a slight infection in one corner of the wound the operation was successful and the resulting ear was an improvement cosmetically. From a practical standpoint the patient claimed that the ear was less sensitive when wrestling. The right ear was not operated because the fibrous masses were smaller and the nature of the patient (psycho-neurosis hysteria) did not encourage further operative procedures.

A TYPICAL MANDIBULAR FRACTURE.

By E. L. WALTER, Lieutenant, Dental Corps, United States Navy.

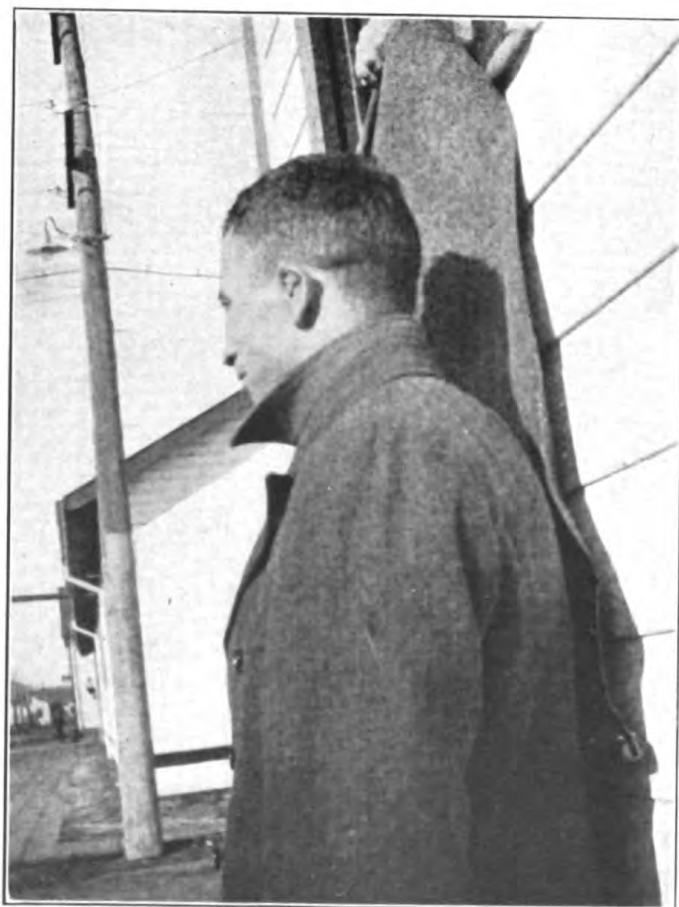
During a street brawl the patient received a blow on the left mandible, probably with a bottle, which resulted in a simple fracture through the body in the region of the mental foramen.

When seen next morning he showed all the symptoms of a simple fracture, although there was no external wound and apparently little or no displacement. His mouth was very septic, containing several abscessed teeth.

After scaling and cleaning the teeth and mouth, an interdental wire splint was applied, using No. 26-gauge brass wire; one splint



ORGANIZED OTHEMATOMA, BEFORE OPERATION.



AFTER OPERATION.

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from the second molar and second bicuspid below to second molar above, posterior to line of fracture; two splints in the larger anterior segment.

X ray taken a few days later showed a transverse fracture through the body of the mandible between the cuspid and first bicuspid teeth and another fracture running postero-inferiorly, which, with above fracture, formed a triangular segment of bone completely unattached and slightly displaced inferiorly. Articulation, the relationship of the jaw and the apposition of the fractured ends were good. A tight four-tail bandage was applied to take care of the unattached segment.

The wires were tightened and renewed as indicated and the patient was given frequently a mouth wash of potassium permanganate. Liquid diet was given by means of a glass tube inserted through the space formerly occupied by the upper first molar.

Twenty-five days after injury the interdental splints were removed and intradental splint applied, including two teeth on each side of fracture in splint. This permitted mandibular movement and removed the strain on the wired teeth, thus affording the patient much relief.

An X-ray picture taken one month after the injury showed considerable bone regeneration in all lines of fracture. All wires were removed and the patient was put on soft diet.

Thirty-five days from the date of injury, the patient was discharged to duty, the articulation, external appearances, and function (except for stiffness in the temporo-mandibular articulation) being normal.

ASEPSIS IN CONDUCTIVE ANESTHESIA.

By W. I. MINOWITZ, Lieutenant (J. G.) Dental Corps, United States Navy.

The appended technique for the administration of conductive anesthesia in connection with certain dental operations is suggested for the consideration of dental officers in the service, as of value in maintaining asepsis, and as a factor in eliminating pain and post-operative soreness.

The value of asepsis in dental operations can not be too strongly emphasized, and a careful observance of the details suggested should establish a high standard of treatment that habit will soon make swift and sure.

The materials necessary are the following:

1. Water still.
2. Packets containing 3 towels, 10 napkins, 1 dozen cotton pellets, or small cotton rolls cut one-eighth of an inch in length.

3. Conductive syringe with two platinum needles of proper length and gauge.
4. Two mirrors.
5. Two pairs of cotton pliers.
6. Two napkin forceps.
7. One lip retractor.
8. Four pairs of rubber gloves.
9. Two porcelain dissolving cups.
10. Cover glass for cups.
11. Ringer tablets and novocaine.
12. Iodo-glycerol and tincture of iodine.

Thirty c. c. of distilled water is freshly distilled every morning for use throughout the day and placed in a sterile flask whose mouth is then plugged with sterile cotton. Before removing any of the water, the cotton plug should be passed through a flame. Likewise, the plug should be sterilized before it is replaced.

The packets, at least six in number, should be sterilized in a pressure sterilizer, after which they will be ready for use. Several pairs of rubber gloves are sterilized in the same way.

The patient appearing, the instruments, enumerated above, are placed in the sterilizer. After five minutes of boiling, the two porcelain cups and the cover glass are removed by an assistant, and 4 c. c. of the sterile water is placed in each and brought to a boil over an alcohol lamp. In one cup Ringer tablets and novocaine in sufficient quantity are dissolved. While the assistant is making these preparations, the operator is getting scrubbed up. When he has finished scrubbing, sterile gloves are put on and one of the towels from the packet is spread over the bracket table. Upon this towel the operator places the instruments after they have been boiled 15 minutes.

The assistant places a bottle of iodine and one of iodo-glycerol near the table, being careful not to touch the sterile towel with his hands. He then sprays the patient's mouth with an antiseptic.

The patient is instructed to raise the head, and one of the sterile towels is brought around the forehead and secured on the back of the head with a towel forceps. The other towel is brought under the chin and secured on top of the head. Care is taken not to touch the patient with the sterile gloves.

The conductive syringe is now filled several times with sterile water, previously boiled in one of the porcelain cups, and emptied in order to wash away the alkaline used to prevent the instruments from rusting which has a tendency to precipitate the novocaine. The iridio-platinum needle is then placed on the syringe and run through the flame; the cover glass is removed from the cups containing novocaine solution and the syringe is filled. The syringe is

placed on the bracket table and the needle covered with one of the small sterile napkins.

The retractor is placed in the patient's mouth and the lips are drawn outward by the assistant; a sterile napkin is then placed in the patient's mouth to keep the operator's hands sterile.

One of the cotton pellets from the sterile packet is dropped into iodo-glycerol and the part, and surrounding tissues, where the needle is to be inserted is painted and rubbed well. This procedure is followed by the application of a fresh sterile pellet dipped in tincture of iodine. Care should be taken to rub in both of these preparations well, as they sterilize and have a tendency to anesthetize the part. Following this application little or no pain is experienced even by very sensitive patients.

The needle is now inserted with a quick motion and the solution deposited in the tissues. After the syringe is withdrawn the needle is again run through the flame, placed on the bracket table, and the napkin folded over the instruments. This is done in case the operation has to be repeated in which case everything is ready for use, except the lip retractor, which is placed immediately into the sterilizer.

Twenty minutes' time is required for the technique described.

As a supplement to this technique, the patient should be given three five-grain tablets of asperin with instructions to take one if any pain is felt after the effects of the anesthetic has worn off. After an hour has elapsed, if the pain continues, another should be taken, and if this does not afford relief, the third tablet may be taken before retiring.

The asperin, however, is seldom required, as most patients say that the local anesthesia produced according to the above technique gives no unpleasant after effects.

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NOTES AND COMMENTS.

The subject of terminal disinfection after infectious diseases is of widespread interest at hospitals, training stations, and on board ship. and no question is asked more frequently concerning the isolation of contagious patients than what to do to the patient and the room at the termination of such diseases as mumps, measles, diphtheria, scarlet fever, and those diseases we know to be transmitted by contact.

Writing in the *Nation's Health on Disinfection after Infectious Diseases*, Dr. D. L. Richardson, superintendent Providence (R. I.) City Hospital, says in part:

"During the course of the illness the virus escapes from the body either in secretions or excretions of the body or in wound discharges. These are likely to be spread about more or less generally unless great care is taken to prevent that practice, so that theoretically any small or considerable portion of the room occupied by a patient or its contents may be contaminated.

"From a practical point of view, however, it has been found by experience that the whole room and its contents are not contaminated. The things which are most likely to be a source of danger are those which most probably have been soiled by the secretions or excretions and discharges, such as the pillow, the bed clothing, the nursing utensils, bedside table, the chair or chairs occupied by the patient or nurse, the washbowl and toilet, toilet articles, door knobs, etc. It also must be realized that different objects are contaminated to varying degrees. Germs die rather promptly after leaving the body and, while the process of contamination goes on during the illness, the virus is also being constantly killed by drying and by sunlight. As convalescence is established, the number of germs discharged from the body constantly decreases so that at the end of the established period of isolation the patient is quite harmless, except in the case of a small percentage of persons who become temporary or permanent carriers. It usually follows, then, that the infection which reaches various parts of a room early in the disease is quite dead, and that a room occupied throughout the entire course of the disease in most instances is harmless at its termination. On the other hand, if the patient dies or is transferred to another room during the acute process of the disease, the vacated room is a much greater source of danger.

"This more rational view of room contamination is gaining rapid headway. In the minds of those who still cling to the idea of aerial transmission of disease, the whole room occupied by a patient is a hotbed of infection. Careful observation in the hospital and home prove this view is not tenable.

"Fumigation is no longer thought to be necessary and serves no other purpose than to appease the conscience of hospital authorities, health officers, and the public. In March, 1905, Chapin in Providence ceased fumigation after diphtheria unless it was requested by the family. In his annual report for 1908 he statistically shows that there had been no greater recurrence of the disease in homes after discontinuing disinfection than before. In November, 1908, he ceased fumigation after scarlet fever, and subsequent experience confirmed the fact that it was not necessary after this disease. Since that time gaseous disinfection after contact disease has been quite generally abandoned in the United States, although it is still practiced in many communities and hospitals.

"That gaseous disinfection is at least unnecessary, hospital experience has conclusively shown. Since the opening of the Providence City Hospital in 1910 no fumigation has ever been done. There has been no evidence in a single instance that thorough cleanliness of the room and contents was not entirely sufficient. A detailed study of this may be found in an article published by the writer in 1913-14, volume 1, pages 70-80, of the *Modern Hospital*. It is obvious from this study that no child who contracted an infectious disease in the hospital did by any stretch of imagination pick up the infection from the room which had been previously occupied by the patient suffering from the same disease. The same procedure has been carried out for the prevention of ambulance infection, and there is no evidence that any ambulance has ever been a source of disease.

"In terminating isolation it should be emphasized that the patient is a far greater potential danger to others than the room he occupied during his illness. He may be a carrier of diphtheria, typhoid, or scarlet fever, as the case may be. It is a very difficult problem to free him from such infection; certainly it can not be done by any kind of a bath. The room and its contents, however, are quite free from infection by the time the patient convalesces in it. If, as has been stated, the patient is sent to the hospital or dies in the acute process of a disease, then the possibility of room infection is of some importance. It is not contended that room infection might not be possible, particularly if contents may be smeared with secretions or excretions, but it is strongly maintained that such a source of infection is very slight and that the importance of terminal disinfection has been much exaggerated. If the excretions and secretions of the

patient have been promptly disposed of and strict cleanliness observed during the nursing of the patient, room infection is trifling.

"Terminal disinfection applies first to the patient; secondly, to the room and its contents.

"It is very proper for the patient to have a bath on discharge; but any infection carried on the surface of the body is not to be compared to the possibility of germs being carried in the nose and throat or intestinal tract. A bath of soap and water, including a shampoo, is quite sufficient. It is not of sufficient importance to require the use of chemical solutions. In the hospital a patient should receive the terminal bath a day before discharged and be placed in a 'clean room' so that he will not be sent out of doors before he has had time to dry satisfactorily. This is particularly important after scarlet fever, for exposure may set up rhinitis and if the patient is still a carrier a discharging nose renders him much more infectious. After the cleansing bath the patient should put on clean clothing and the infected clothing to be left in the room.

"The treatment of the room after discharge of a patient differs in the home and in the hospital. Terminal disinfection of a room in the hospital will first be described. It is assumed that the room has been occupied by the patient alone. The patient's washable clothing, the bed linen, towels, etc., should be collected into a bundle and sent to the laundry to be washed. Mattresses and pillows should be put out in the sun for at least six hours. If the patient dies in the acute stage of the disease or is transferred from the room while acutely ill, or if the clothing is obviously soiled, it should be sterilized by steam under 15-pound pressure for 30 minutes. Continued sterilization by steam injures the fabric so that mattresses and pillows soon become very much damaged. It is found that sunning in the open air is under ordinary circumstances quite sufficient. Such textile clothing of the patient as is not washable should be hung out in the sun for at least six hours. Shoes, belts, gloves, rubber goods, money, and other valuables may be washed with soap and water and air-dried, preferably in the sunlight. Magazines, papers, and books should be destroyed or pinned up in a towel and sterilized by steam. All nursing utensils not damaged by heat should be boiled for at least 10 minutes. Thermometers and other small articles can be submerged in 70 per cent alcohol solution or of phenol 1-60 for half an hour. Toilet articles should be washed with soap and water and air-dried. The bed, bedside table, chair, bell cord, lavatory, door knobs, curtain cords, and the wall about the lavatory and window should be washed with soap and water.

"If the patient sick with an infectious disease is in the same room with other patients, it is very important to ascertain whether the other patients are immune to this disease. All those who are sus-

ceptible should be isolated separately during a period equal to the incubation period of that disease. The first patient should be isolated as soon as discovered, preferably in a separate room. After his removal disinfection should be carried out just as described above except washing of the walls. The mattress, pillow, bed linen, and nursing utensils may be moved with him to the room where he is isolated if it is in the same ward. It is not necessary to clean the whole room or to subject other patients in the room to the same procedure, but the latter should be watched carefully, so that symptoms may be detected at the earliest possible moment.

"Terminal disinfection in the home is more perplexing because of the presence of many articles of furniture, draperies, shades, carpets, rugs, and the like. Again, it should be emphasized that the room as a whole is very slightly infected. It is not necessary to destroy these things nor subject them to a damaging process of sterilization. Neither is it necessary to repaint and paper the room.

"Methods of disinfection as described for a room in an institution are applicable in a home, including, of course, the cleansing bath of the patient. The mattress and pillow, blankets, draperies, rugs, etc., should be put out in the sun for at least six hours. Furniture and woodwork can be washed with soap and water, employing a neutral soap, so that the finish will not be damaged. Attention should be paid also to the bathroom and fixtures, and especially to utensils used by the patient or his nurse, as already described. Utensils which are boilable should be boiled in a pan before being washed. All the linen in the room should likewise be boiled before washing. After airing for 48 hours the room is quite safe for anyone to occupy.

"It is quite right that terminal disinfection should be carried out faithfully, but, outside of the bed, bed linen, and nursing utensils, possibilities of infection are very slight. These methods of disinfection are really of value, but fumigation as ordinarily applied accomplishes very little and is unnecessary. Too much stress has been put upon contaminated surroundings and too little upon the patient himself of those persons whom he has exposed. The chief source of infection in contact diseases is not environment, but direct or intimate contact with the fresh secretions or excretions of persons who are suffering from diseases in a frank or unrecognizable form, and with carriers."

The following changes have been made in the manufacture and issue of triple typhoid vaccine at the Army Medical School:

1. The content of Para A and Para B bacilli has been reduced from 750 million each to 500 million each per c. c. Therefore, the present composition of the vaccine is 1,000 million typhoid bacilli, 500 million

Para A bacilli, and 500 million Para B bacilli per c. c., a total of 2,000 million per c. c.

2. The time of expiration has been extended from four to six months.

3. The vaccine will be issued in special rubber stoppered bottles as well as in ampules.

These changes take effect beginning with lot No. 200, manufactured February 16, 1922.

1. The strength of the vaccine has been reduced in order to meet existing indications more closely. During the war, when the present triple typhoid vaccine was adopted, there was a certainty of high exposure, at least among combatant troops, to all kinds of typhoid fevers, and it was desirable to obtain as high an immunity as possible irrespective of severe reaction. At present, what is required is a good immunity without too severe reaction. The reactions from the present vaccine are well marked and are occasionally severe. The ordinary exposure to paratyphoid infections, however, is much less than that to typhoid infections, and the para fractions are the most toxic and produce a relatively large part of the reaction. It has, therefore, been decided to reduce the para fractions, but at the same time to leave a sufficient number of bacilli in the vaccine to produce a good immunity. Actually, on account of improved methods of standardization, the new vaccine will contain as many or more paratyphoid bacilli than some of the vaccine used during the war.

2. The present time of expiration is four months in the United States and six months in territory outside the United States. The period has now been made six months for all situations. Recent work at the Army Medical School has shown that the protective value, for the typhoid group, of a six months vaccine is fully as great as that of a four months vaccine. Commercial firms are allowed a limit of twelve months on their vaccines. Army medical officers are not prepared to go this far, but six months is considered a safe period.

In commenting on the Naval Medical Service, a writer in the *Lancet* for August 26, 1922, remarks:

"Naval life may lead to opportunities for putting into practice much of what has been learned in the clinical wards of a hospital. Further, the opening for preventive medicine is large and many-sided, while appointments to the large shore establishments enable medical officers to keep their work modern.

"New chemical explosives, as well as the extraordinary behavior of common articles under extraordinary conditions of stowage, furnish perpetual problems and surprises for the medical officer on board ship, and bring him into intimate connection with his charges

in a way that is particularly necessary considering the conditions of life. No medical officer can expect to succeed unless he secures the confidence of those committed to his charge, and the health lectures which he is bound to deliver will be much more fruitful if they are delivered to an audience which trusts him. Moreover, the delivery of official lectures does not end this side of the medical officer's duties. He must be ready to answer questions sometimes of real acuteness, which are put to him by the modern blue-jacket, and he will find that his lectures will often afford a starting point of work that may develop into great professional interest. Thus, without his being necessarily a psychologist, his influence will be felt by both officers and men, until the well-being of the ship may be profoundly affected by the extent of his tact and skill; for example, small matters assume undue proportion under stress of confinement, and the medical officer should be quick to detect danger signs and warn his commanding officer. Numerous changes have been introduced during the last 20 years into the naval dietary, many of which were the outcome of representations and research by naval medical officers. The work wants carrying on, for much of it has gone to show that the food problem is very complicated. Every medical officer on board ship should make himself acquainted with food values and the human powers of assimilation under varying conditions of work and climate, and here there is ample scope for research. The modern requirements of gunnery and navigation necessitate precision in their use and have made ophthalmology a valuable subject for study in the Navy. The physical training of both officers and men is based on physiological axioms which are peculiarly the field of the medical officer; this training should be the subject of a watchful eye. There is no lack of scope here for professional work without making any reference to the vast problems which have to be faced when the medical officer has to arrange his particular department to the best advantage during or after an action. It is certain that he gets himself ready by study. Lastly, there is the whole field of venereal and tropical diseases.

"The young medical officer need not be afraid that his work will be without scientific interest if he takes the opportunities offered him.

The classics of medicine are more talked about and less read than those of other ancient sciences because, as a reviewer who contributes the following comments on *The Selected Works of Thomas Sydenham, M. D.*, by Dr. John D. Comrie, recently published in London by Bale, Sons & Danielsson, infers, only a few have been rendered into agreeable modern English:

"Nominally, Sydenham is one of the most accessible of classics. The old Sydenham Society's editions, Greenhill's text, and Latham's

translation are in every library and not scarce in the secondhand book market. But Latham's translation is, as the author of *Rab* more than hinted, very dull, while the text is Latin—and, we think, remarkably unattractive Latin.

“Why has Sydenham become immortal? Until now we should not have ventured to give reasons because the means of judging whether our reasons were right or wrong have not been in everyone's hands. Now, thanks to Doctor Comrie, anyone can tell whether we have hit the mark, so it may amuse Doctor Comrie's readers if we attempt to justify the title of ‘English Hippocrates’ given to Sydenham.

“We hope it is not irreverent to think that Sydenham is immortal because he applied to the art of medicine the spirit of Pauline Christianity as set out in four verses of Corinthians (i, 22–25); he separated himself both from the Jews who require a sign and from the Greeks who seek after wisdom; he believed that ‘the foolishness of God is wiser than men, and the weakness of God is stronger than men.’

“The part of the Jew seeking a sign was taken by the physician who wearied his brains ‘with curious and irrelevant speculations, which to fulfil the promise of medicine, to save men's lives, are not worth anything,’ and the seekers of wisdom were ‘the slaves and followers who like the first inventors of speculations do deadly battle over these whimsies, while not a man of them reaches the truth, because however hard we try, we mortals can not learn, and I think never will learn, how nature acts, but only what she does and where she does it’ (*Epistolary Dissertation*, 56). Sydenham believed that there was no vicarious salvation to be found by the physician; very little was to be learned from books—hence his advice to read *Don Quixote*—nothing to the purpose from what we now call the institutes of medicine, from anatomy and physiology. There is much in his attitude which recalls an earlier revulsion from the wisdom of this world; his ‘nature’ is the ‘God’ of the Christian fathers, a wisdom not to be comprehended by mortals. At this time of day we are in small danger of being misled by the exaggerations into which his philosophy of medicine beguiled him. But there is some risk of our forgetting that his doctrine is fundamentally true, that a physician becomes really wise by the study of individual patients, that the reading of many books and the performance of many experiments in laboratories can never be substitutes for the ‘practice and that alone’ which ‘elicits the indications of cure out of the phenomena of the diseases themselves’ (*Epist. Resp.*, 1, 51).

“We can all remember the sort of thing we did when we were clinical clerks. The medical registrar or the house physician had entered on the bed sheet of the patient ‘pleurisy with effusion,’ and

we went home and looked up 'Osler' and thereafter found in the patient the physical signs which he *ought* to show, but very often did not. This must be the way of beginners, but we need to guard ourselves from the habit of looking upon patients as the living 'movies' of textbook descriptions, from the danger of being misled by the analogy of diseases with plants which may be 'spotted' by aid of a textbook. Although Sydenham himself used that very parallel it never misled him in practice. 'I confidently hold that the aforesaid species of disease, in particular the continued fevers, may vary so enormously that you may kill your patient at the end of the year by the method which cured sufferers at the beginning of it' (*Obs. Med.*, i, 2, 37). So it is not enough to identify your particular case of measles with the measles of 'Osler' or 'Taylor'; you must study your patients individually.

"Some men of our time have dreamed that, whether by bacteriological, chemical, or perhaps physiological research, a great intellectual synthesis may be achieved, a new universal *organon* discovered, which will enable us to give an account of the changes of general and individual type of diseases, to foretell them, and so act appropriately. In the dialect of our theological comparison, such persons are like those who look for the immediate coming of the Kingdom of Christ. To Sydenham anything of the sort was an idle dream; whether what has been learned since his time is enough to warrant a change of attitude is a point which might be debated. But the discussion is idle, since, here and now, the method of Sydenham, the natural historical method of study, can be followed without hindering the work of those forging the *organon*. Were it permitted to Sydenham again to take coach exercise in Pall Mall and to visit the new home of his old college, he would surely recognize that the 'philosophers' had produced something better than 'curious and irrelevant speculations,' that Lister and Pasteur owed more to them than to him. But we think he would again enforce upon general practitioners the lessons of which the college physicians of his time stood in need, and perhaps think better of Sir James Mackenzie and his school than of the apostles of 'Epidemic Constitutions.'

"I am fully convinced," he would say again, "that, for the formation of right judgment in these matters, there is nothing so beneficial as the exact observation of the natural phenomena of the diseases themselves, likewise of whatsoever helps or hurts, and lastly of the remedies themselves and of the method we adopt to try to drive away the disease. By diligently examining and weighing all these I learn the nature of the ill and from whence I am to take indications of treatment. I learn it much better and much more surely than if I took some speculation concerning the nature of this or that principle as my pole-star. The choicest dissertations of this kind are no more than pretty tricked out metaphors which will go the way of all figments of the fancy, not grounded in the nature of things; time will utterly destroy

them. The decisions of Nature, grounded in the truth of things, these shall not perish save with Nature herself." (*Tract. de Hydrope*, 23.)

"Hippocrates said that philosophy must be wedded to medicine and medicine to philosophy, that the physician who is also a philosopher is evened with the gods (*De habitu decenti*, cap. 5). The puritan Englishman was humbler minded, but his gospel is one of encouragement, and its message is this: That way of 'research' which is open to every doctor, which needs neither ultra-microscopes, nor knowledge of Greek, nor familiarity with differential equations, is the best of all. Perhaps the greatest of all discoveries will not be made by the 'consultant' whom we recently found so difficult to define, but by a general practitioner who brings to the research neither the contents of the *Index Medicus* nor the arithmetical wisdom of the registrar general and his assistants, but the brains with which Opie mixed his colours and the courage of Sydenham, together with his humility. This courage and humility, we think, justify Sydenham's reputation; whether we are in the right, Dr. Comrie's readers can judge for themselves."

It may be remembered that among the Notes and Comments in the issue of the Bulletin for August, 1922, an account was given of the career of Thomas Dover, buccaneer and inventor of the powder which bears his name. Doctor Dover was credited with the rescue in 1710 of Alexander Selkirk, the hero of Defoe's *Robinson Crusoe*, who had been marooned on the island of Juan Fernandez. Probably, however, says the British Medical Journal for August 26, 1922, in commenting on some other buccaneer surgeons, the credit should be given to William Dampier, who had known Selkirk long before, and, moreover, was well acquainted with the island which he calls John Fernando's.

More than a quarter of a century earlier Dampier had taken part in the great buccaneering expedition across the Isthmus of Panama to the South Sea and after various excursions and adventures had been one of the party which returned on foot to the Caribbean Sea. Wherever he was and despite all difficulties this remarkable man seems to have kept a journal in which he noted not only daily events but descriptions of the manners and customs of the natives, of the flora and fauna, the weather and the chief physical features of the country. In his descriptions of the voyages of the buccaneers (or privateers, as they preferred to call themselves) there are frequent references to the surgeons, which show how much their services were valued. Thus Dampier states that on one occasion a ship's company refused to put to sea because they had no surgeon; and when "our surgeon, Mr. Wafer," was injured "we allowed him a slave to carry

his things, being all of us the more concerned at the accident, because liable ourselves every moment to misfortune and none to look after us but him."

When the buccaneers landed to attack a town the surgeons accompanied them, and it is recorded by Dampier that in an attack on an Indian town in Mexico "our surgeon and one man more were wounded with arrows." In the disastrous attack on Arica in 1680 the surgeons had occupied a church as a hospital, where they found a store of wine. Possibly this discovery accounts for the fact that they were left behind when their comrades retreated. They were, however, released by the Spaniards on their consenting to settle down to practice in the city.

In the reign of Charles II the professional education of the average practitioner in England probably consisted almost entirely of the acquirement of precepts and experience in the service of a master under the apprenticeship system. Theoretical knowledge was at a discount. Anatomy, physiology, and chemistry were then far outside the ordinary curriculum, and even seventy years later, when the practice of surgery had made great advances, Roderick Random's master is represented as preferring the knowledge of "how to bleed and give a clyster, spread a plaster and prepare a potion," to that of the causes of muscular action and the mystery of the brain and nerves.

The surgeons of the buccaneers probably worked by rule of thumb and gained their knowledge not from books, but from their masters and their own hardly won experience. The crews were probably less liable to scurvy than those of less law-abiding vessels, for they relied for food largely on such fish and turtles as they could catch, and were frequently ashore, where they got fresh vegetables and cattle. The beef they did not eat fresh they smoked and stored on board, and the name of buccaneer is said to be derived from a Brazilian word signifying "smoked meat." Yet they were not immune from scurvy, for Dampier tells us that—

"At John Fernando's our sick men were ashore all the time" (sixteen days) "and one of Captain Eaton's Doctors (for he had four in his Ship) tending and feeding them with Goat and several Herbs, whereof here is plenty growing in the Brooks: and their diseases were chiefly Scorbutick."

No wonder it was thought worthy of record that in a certain prize they took seven or eight tuns of marmalate of quinces, for marmeloes or quinces had been recommended fifty years earlier by Captain John Smith in his *Accidence, or the Pathway to Experience Necessary to all Young Seamen*.

One of the buccaneer surgeons, the Lionel Wafer above mentioned, left an account of his experiences in *A New Voyage and Description of the Isthmus of America*, London, printed by James Knapton, at

the Crown, in St. Paul's Churchyard, 1699. It is not known where he was born, but he appears to have been an Englishman with some knowledge of Scotland and Ireland. His first voyage, "being then very young," was made "in the Service of the Surgeon of the Ship" to the Strait of Malacca in 1677. Two years later he went in a similar capacity to Jamaica, where for some time he practised surgery, but falling in with two privateering captains there he was tempted to try his fortune with the buccaneers, and after some adventures on the Atlantic coast of Central America he crossed the isthmus with Dampier and others under the command of Captain Bartholomew Sharp. In the Pacific he went as far as Juan Fernandez and Drake's Island, but after various adventures on sea and on shore he and Dampier joined the party of some fifty men who were dissatisfied with Sharp's leadership, and in a ship's longboat and native canoes started to return to the isthmus and recross it on foot to the Caribbean Sea. On the fifth day of the journey Wafer was disabled. The accident is best described in his own words:

"I was sitting on the ground near one of our Men, who was drying of Gunpowder in a Silver Plate. But not managing it as he should, it blew up and scorched my Knee to that degree, that the Bone was left bare, the flesh being torn away, and my Thigh burnt for a great way above it. I applied to it immediately such Remedies as I had in my Knapsack: And being unwilling to be left behind my Companions, I made hard shift to jog on, and bear them Company for a few days; during which our slaves ran away from us, and among them a Negro whom the Company had allowed me for my particular Attendant, to carry my Medicines. He took them away with him, together with the rest of my Things, and thereby left me deprived of wherewithal to dress my Sore; insomuch that my pain increasing upon me, and being not able to trudge it further through Rivers and Woods, I took leave of my Company, and set up my Rest among the *Darien* Indians."

To this incident we owe the interesting account of the Indians which Wafer has given. At first he and his four companions were objects of some suspicion at the Indian settlement and were rather roughly treated, although, as he says, "Not that they were naturally inclin'd to use us thus roughly, for they are generally a kind and free-hearted people." When, however, the natives heard of the good treatment which some of their fellows had received from Dampier and his party they became kind and hospitable. The *Darien* Indians seem to have been generally well disposed towards the English, partly because they hated the Spaniards, with whom the buccaneers waged war, and partly because, as it seems, the English had the good sense—perhaps the humanity—to treat them well. Had the natives been hostile traveling by land would have been made more difficult than it was, if not quite impracticable.

Wafer seems to have been much impressed by the presence of albinos among the Indians; their numbers he estimated at one to

every two or three hundred of the population. He seems to have been quite ignorant of the existence of albinism in Europe, and of course does not use this term, but he quite accurately describes it, including the visual troubles which are incident to it, and he realized that the albinos were not a separate race. Much as he liked the Indians, he did not extend his affection to their arboreal cousins, the monkeys of the isthmus, who, he says, are—

"a very waggish kind of Monkey, and played a thousand antick Tricks as we march'd at any time through the Woods, skipping from Bough to Bough, with the young ones hanging at the old ones Back, making Faces at us, chattering."

The buccaneers found the monkeys very good eating and taught the Indians to overcome their repugnance to this kind of meat.

One of Wafer's party was a Mr. Richard Gopson, who had served an apprenticeship to a druggist in London. This bold buccaneer carried with him a copy of the Greek Testament; he occupied his leisure in its study, and would read aloud in English to anyone who cared to listen. Gopson is an instance of the heterogeneous composition of a privateer's crew, to which Dampier alludes when he says that one ship's company comprised skilled artisans in every craft, so that they were capable of all sorts of constructive work, as well as of the wanton destruction with which the buccaneers are generally credited.

No doubt many of them were not criminally inclined, but took to the life from sheer love of adventure, tintured with the hope of gain. Their life was hard at sea, and no less hard when traveling on the isthmus carrying all their belongings on their backs. Crossing a river in flood, loaded with a heavy musket, ammunition, and three or four hundred pieces of eight (or dollars), was no child's play, and at least one of them owed his death to his load of silver, which must alone have weighed more than twenty pounds.

His dressings and drugs being lost, Wafer submitted to an Indian method of cure, which consisted in the application of poultices of chewed herbs of unknown origin; in this way he was cured in twenty days, except for a persistent weakness and numbness. Native surgical methods seem to have been less simple, for Wafer gives the following account of the way in which a patient was bled:

"The Patient is seated on a Stone in the River, and one with a small Bow shoots them as fast as he can and not missing any part. But the Arrows are-
gaged, so that they penetrate no further than we generally thrust our Lancets: And if by chance they hit a vein which is full of Wind, and the Blood spurts out a little, they will leap and skip about, showing many Antick Gestures, by way of rejoicing and triumph."

A similar method has survived in New Guinea up to the present time for opening abscesses. Specimens of the bows and arrows

employed are to be seen in the Wellcome Historical Museum, 54A, Wigmore Street, London.

There is a quaint illustration in the original book showing this operation. It having been decided that one of the wives of Lacenta, the Indian king, should be blooded in this manner, Wafer persuaded the king to allow him to bleed from a vein in the usual way. Alarmed by the sudden gush of blood, the Indian at first threatened to take the operator's life, but when the arm was bound up and the patient happily recovered he was delighted with his new court surgeon. Just as Dr. Gabriel Boughton is said to have gained the confidence of the Emperor of Delhi and his viceroy by his successful treatment of their womankind, so on a much smaller scene did Wafer gain the confidence of the king of the Darien Indians, to the no small advantage of himself and his companions. So successful was he that the king could not for a long time be persuaded to part with him, but kept him about his person, offered him his daughter in marriage (as soon as she should be old enough), and took him with him on all his expeditions. Wafer "lived in great Splendour and Repute," and adopted the Indian full dress of a coat of paint, a gold nose plate clipped on to the septum nasi and hanging down over the upper lip, and a funnel or horn concealing the penis, but leaving the scrotum exposed. The painting was done by the women, usually by tattooing; to this Wafer would not submit, but he had the colours laid on in little specks, "red, yellow, and blue, very bright and lovely."

Lacenta was at length persuaded to part with the Englishmen on a plausible pretext and sent them to the north coast, where they found Dampier and his friends with a vessel, which they had acquired in the usual way. The journey across swollen torrents and a lofty mountain range was difficult and in traversing the mountains the Europeans seem to have suffered from the rarity of the air.

Wafer had been some hours on board ship in his coat of paint and his nosepiece before he was recognized with the joyful shout of "Why, it's our doctor!" He says that a month elapsed before all the paint had worn off.

For six years more he was with the buccaneers: in Virginia, on the Guinea coast, and round Cape Horn to the Philippines, and then back to London. Besides the account of his life among the Indians his book includes descriptions of the country and its products, and of his adventures in the South Sea, but these are of little interest compared with those of Dampier, and it is to be remembered that, as he says, he kept no journal, whereas Dampier made notes of his observations at the time. No doubt Wafer was induced to publish his book by the interest excited at home by Paterson's disastrous attempt to colonize Darien. The main facts of his story are corroborated by Dampier, and there seems no reason to doubt his substantial accuracy.

With the advent of peace between France and Spain and a better understanding between Great Britain and that country, the buccaneers' occupation soon became too hazardous. The more desperate characters among them became pirates of the indiscriminating and uncompromising type with which writers of fiction have made us familiar, many of whom ended their careers at Execution Dock, instead of, like Wafer and R. L. Stevenson's Industrious Pirate, "retiring and being respected by his neighbours."

As to Dampier, he became a recognized authority on geography, oceanography, and meteorology, and as such is consulted by the Government, and was given the command of a king's ship with which to explore New Guinea and Australia, where he gave his name to Dampier's Straits, but accomplished little else of note.

Herbert A. Potts, Chicago (*Journal A. M. A.*, Sept. 16, 1922), in commenting on the pathologic changes which occur within the mouth, and the bearing which these changes may have on the more remote parts of the body, says: When, as a result of infection, the attachment of the fibers of the peridental membrane is severed, we have not only a pus-soaked cementum incapable of repair, which exerts a negative chemotaxis tendency, but also the actual disappearance of the fibers and bone into which they were inserted, and the loss of the cementoblasts which make such a repair possible. Replacing this loss of tissues is a mass of suppurating inflammatory tissue not protected by epithelium, from which toxins and bacteria find their way into the system and through which other bacteria of the mouth may readily pass. Pyorrhea and chronic alveolar abscess, both propagated by dead cementum, are the results of two factors, gingivitis and death of the tooth pulp. The first requisite in the conservation of healthy teeth and their investing structures is the avoidance of gingivitis, which is caused by numerous faulty conditions, among which are salivary calculus and serumal calculus, which is due to (a) lack of contact of the teeth; (b) improper contact; (c) deviation from the normal, smooth contour of the teeth; (d) lack of cleanliness; (e) misuse of the tooth-pick, rubber-band, floss-silk or tooth-brush; (f) overhanging margins of fillings; (g) ill-fitting crowns, etc. Pyorrhea is probably not due to any specific organism. The greatest achievements in medicine have been in the prevention of disease rather than in its cure, and so much the greatest dental service be attained by prevention rather than by restoration. This prevention must begin with the eruption of the temporary teeth and continue at intervals, depending on the necessity of each individual, through life. Routine physical examination should include a more thorough oral examination, and the treatment of oral lesions should

be based on a working knowledge of pathology. In the vast majority of cases, neglected gingivitis becomes chronic, and its duration, over a period of months or years, not only leads to a destruction of normal tissues both soft and bony, but is a menace to health in two ways: (1) by the constant suppuration with absorption and swallowing of bacterial by-products, and (2) by the entrance of bacteria themselves into the lymph and blood streams, with their arrest in distant parts where they set up other foci of infection.

Milford E. Barnes, Bangkok, Siam (*Journal A. M. A.*, Sept. 16, 1922), reports two fatal cases following the administration of thymol for the relief of hookworm infestation. The majority of patients treated with thymol show some signs of its toxic action, such as flushed face, slight dizziness, and drowsiness. The symptoms usually disappear rapidly after the administration of the final purge. In some countries the drug is dispensed to the patients, who are permitted to take it in their own homes without medical supervision. This practice is not followed in Siam, where the entire course of treatment is personally administered by the medical officer in charge or by his trained dispensers. These rules have been adopted for the administration of thymol: (1) A preliminary small dose of magnesium sulphate is taken by the patient the evening before treatment. (2) No breakfast is permitted on the day of treatment. (3) At 7 a. m., 20 grains (1.3 gm.) of thymol mixed with an equal amount of lactose is administered in capsule. (4) At 9 a. m., an additional dose of 20 grains of thymol is given. (5) At 10 a. m., a final purgative dose of magnesium sulphate in hot water is administered.

From the *Nation's Health* for July, 1922, we glean the following four notes of sanitary and hygienic interest:

"One of the greatest deterrents to successful vaccination in the Tropics is the difficulty of maintaining the potency of the vaccine in situations remote from ice. Various expedients have been resorted to, of which the best has been the thermos bottle. The method is to fill the bottle about half full of finely cracked ice, then a layer of capillary tubes of vaccine matter, tied in bundles of forty each, then a fine layer of cracked ice. When vaccinations are to be performed, the metal cap of the bottle is almost filled with ice water containing a few pieces of ice and a bundle of vaccine tubes, which are removed from the ice water one by one as needed and only immediately before application to the scarified area. Even with the great care, it frequently happens that the number of positive results is not greater

than 10 per cent or 15 per cent. The Director of Health of the Philippine Islands, Dr. Vicente de Jesús, in his report for the calendar year 1920 expresses the belief that these difficulties have been overcome by the use of the pulverized smallpox vaccine prepared by the Philippine Bureau of Science. Since this statement grows out of the observations of nearly fourteen million persons since 1918, it should carry great weight. The dried vaccine is put in one rubber-stoppered amber glass vial and the glycerin for making the suspension in another, fifty units in each vial. The vaccine must be kept in a cool, dark place and must not be exposed to direct sunlight or artificial heat if its potency is to be maintained. To use, the stoppers are drawn from both vials; the glycerin is poured into the vial containing the pulverized vaccine; that vial is restoppered and shaken until the powder is completely emulsified. Vaccinations should follow immediately. It is claimed that by this method, positive results are obtained in 70 per cent of vaccinations."

"The health department of the city of Panama, R. P., for more than two years has been making its own sticky fly solution. This is made by heating together five quarts of castor oil with twenty pounds of clear resin, with stirring, until a clear solution is formed. This may be spread on sheets of paper or long spirals of paper. Neither of these methods is neat. The pieces of paper blow about and other things besides flies get stuck on them. Furthermore, it is not easy to place them where the fly most commonly alights, that is on projections nearer the ceiling. It was found that wires coated with the sticky solution make good flytraps. For this purpose baling wire is bound into hanks the upper end of which is bent into a hook. Baling wire is used because it is a suitable size and discarded pieces may almost always be secured free around any stable using baled hay. As soon as the hank of wire has become covered with adherent flies, it is cleaned by washing with boiling water and lye, after which it is redipped. For catching flies on tables it was found that a spiral spring, such as is commonly used in automobile or other upholstery, serves admirably when dipped in this solution. The base of the spring is fixed to a square piece of board or metal. Such springs may be secured free from discarded upholstery. The method is simple, inexpensive, and efficacious."

"Many observers abroad are of the opinion that fluid extract of squills is a most efficient rat poison. It is claimed that it has thrice the toxic effect of barium carbonate and is relatively harmless to animals and birds. It is cheap and, since it creates great thirst, the

poisoned rodents die in the open. It is prepared by macerating freshly purchased bulbs of *Urginea maritima* with alcohol 1:5 for six days and then expressed through a cloth. The baits are prepared by soaking small pieces of bread in the fluid extract. Poisoned animals are dead by the second day."

"Sulphur dioxid is the aeon-old standby in ship fumigation. It is a fairly good agent of deratization; accidents to human beings very seldom follow its use; it is relatively cheap; it requires very little apparatus to use; highly skilled labor is not absolutely necessary in its application. On the other hand, its diffusibility is not good; its weight sometimes makes post fumigation aeration somewhat slow; it is destructive to colors, and tarnishes or even corrodes certain metals.

"Carbon monoxid is of considerable value; it is fairly efficacious for killing small mammals; it is fairly cheap; it is not destructive; there is no danger from fire during its use, as with sulphur dioxid; it is light and aeration is easy following its use. A special apparatus and skilled operatives are required for its use; its diffusibility is not uniform and is uncertain; in the presence of a humid atmosphere it is apt to cause sweating of painted surfaces; it is odorless, tasteless, nonirritant, and invisible and has therefore the great hazard that someone may walk into it and be killed.

"Hydrocyanic acid gas is an extremely valuable fumigant; it is highly lethal for mammals, many insects, and all birds; it is highly diffusible, relatively cheap, and not destructive. Skilled and dependable labor is required for its use; aeration must be perfect before the fumigated compartments may be entered. It is a useful but highly dangerous weapon in the armamentarium of the sanitarian.

"An attempt was made by Seguy F. (*Arch. de Med. et de Pharm. Nav.* 1921, III, No. 6, p. 509 *et seq.*) to utilize chloropicrin in the proportion of 5 cc. per cubic meter as a deratizing fumigant for ships. The chemical formula of chloropicrin is CCl_3NO_2 and is made by the action of calcium hypochlorite on calcium picrate. It boils at 111.9°C. , freezes at -60.2°C. , and has a density of 1.648 at 25°C. It is an intense lachrymant. For a ship of four thousand cubic meters' capacity—about 1,500 registry tons—twenty liters at a total cost of 280 francs—about \$50 gold—were required. The agent killed all rats and bugs, but 24 hours' aeration was necessary. The difficulty of removal of the gas by ordinary ventilation methods interposes an almost insuperable obstacle by reason of the time element involved. This gas is relatively safe, however, because no one will walk very far into it."

From the Long Island Medical Journal for June, 1922, we learn that the Associated Physicians of Long Island recently listened to a symposium on the treatment of gonorrhea, presented by various members of the association who had specialized in the treatment of genito-urinary diseases, in which many interesting points were brought out.

Speaking of experiences with some of the newer remedies in the treatment of acute gonorrhea, Dr. Gray Phillips remarked that the introduction of the antiseptic dyes acriflavine and mercurochrome, in 1917 and 1919, constituted the first marked advance in the treatment of this condition since the advent of the colloidal silver preparations about 20 years ago.

The treatment has become changed from what was practically an expectant one to a series of procedures whereby the gonococci are actively attacked in those parts of the urethra already infected, and, what is equally important, the uninfected portions of the tract are rendered antiseptic and antagonistic to further development of the organisms. However, it was not until daily irrigations of the bladder with a solution of acriflavine were employed from the time of the patient's first visit, even though a deep involvement had not as yet occurred, that consistently satisfactory results were obtained.

Acriflavine appears to be the remedy of choice, and in employing it specialists have found that solution of the dye in distilled water are as efficacious as those in normal salt solution. Either for irrigations or injections a strength greater than 1:4000 need not be used. Irrigations are given to patients while they are in a relaxed sitting posture, the Valentine reservoir being suspended not more than 4 feet above the thighs. The injections are taken by the patient twice daily by means of a blunt pointed urethral syringe, provided with a rubber bulb rather than a piston. The injected solution is retained for five minutes.

During the first week a daily irrigation is given and the patient uses the injection twice daily. During the second week only three irrigations are administered, but the patient continues the two daily injections. By the beginning of the third week the urine is usually clear with an occasional shred. At this time following a preliminary distention of the bladder with 4 ounces of acriflavine solution, a curved sound, 27 French, is passed, and the urethra gently palpated for infiltrated follicles. The patient then voids, his bladder is again distended with acriflavine solution, and he is instructed to refrain from urinating for an hour. This procedure is repeated on the seventh day following, at which time the injections may usually be stopped except in those rare cases where gonococci still persist.

In a paper on the management of acute prostatitis which occurs as a complication in more than half of all cases of gonorrhea, Dr. H.

A. Fisher outlined the following treatment of a case in which the symptoms are severe: The patient should be kept in bed and all local treatment in use for the urethritis immediately abandoned. A hot Sitz bath of 20 minutes' duration, three or four times a day, reduces pain and tenesmus. Free ingestion of water and the use of an alkaline antispasmodic diuretic relieve the tenesmus and the pain due to the irritation of a concentrated urine. A brisk saline purge daily reduces the engorgement of the inflamed parts. If retention of urine occurs, a hot bath and an injection of morphine often enable the patient to void while in the tub. If this is not successful, the patient must be catheterized.

In from a few days to a week, the case will either show improvement or proceed to the suppurative stage in which event the question of when to operate immediately arises. This should not be decided in the affirmative precipitately. The process may terminate by resolution; it may rupture into the urethra or into the rectum. Therefore if the symptoms do not become excessively severe and no definite evidence of pus in large amount exists, operation should be deferred. When operation becomes necessary perineal section is the method of choice.

"In a case in which the symptoms are only moderately severe, the procedure should be the same as for the severe type at the onset. In a few days it will be evident whether the case tends to become more severe. If it tends to subside, light prostatic massage is begun, even though the tenderness of the gland permit no more than a half dozen light strokes. At first this is done with the bladder distended with urine, which is voided immediately after the massage. Later when the tenderness is less marked and irrigations permissible, the urine is voided and the bladder filled with a germicidal solution immediately before the massage and emptied immediately afterwards. Thus the detritus pressed into the urethra is washed away. The solutions usually used are acriflavin 1-4000, nitrate of silver 1-5000, or permanganate of potassium 1-10000 to 1-1500. In the early stage the writer prefers the acriflavin. As the case tends to become subacute the silver nitrate solution is preferred.

"Massage, thus begun as early as possible, tends to prevent the subsidence of the inflammation into the chronic state by mechanically removing the inflammatory debris and stimulating the circulation locally. It is essential that it be not too forceful nor of too long duration. Traumatism of the gland is harmful and should be studiously regulated by the tenderness of the prostate and the reaction of the patient. The pressure need never be more than moderate. The duration varies from one-half to two or three minutes. Epididymitis and exacerbations of the urethritis and prostatitis occur very much less frequently when the bladder is filled before the massage

and emptied immediately after than when an irrigation is given after it.

"In the mild type of involvement, massage is instituted at the onset and is well aided by the hot Sitz baths or rectal irrigations. The use of the vaccine may aid the overcoming of the infection and prevent its spread.

"The prostatic massage should be repeated two to three times weekly, until the prostate is freed from the infection. Exactly when this occurs is difficult to determine. The amount of pus measured in terms of the average number of pus cells to the microscopic field varies quite constantly with the improvement of the prostate. The writer considers a prostate is freed of the infection when four smears of the expressed secretion taken at weekly intervals are normal—normal except that a slight increase of pus cells is permitted, not more than four to six to a very occasional field. The gonococcus must of course be absent.

"As the result of the above treatment, the prostatitis is either cured or progresses into the chronic form. Exacerbations may occur at any time and are treated as indicated above. As the symptoms of the prostatitis subside the measures for the urethritis are resumed."

Commenting on the management of acute gonorrheal epididymitis, Dr. Augustus Harris remarked that a large majority of patients respond to expectant treatment. The patient should be immediately put to bed and given a preliminary cathartic, low diet, and plenty of fluids. The testicle should be suspended in such a manner that the cord will be relaxed, relieving the epididymus of all tension and pressure. For the relief of pain an initial dose or two of morphine may be necessary. All local treatment for urethritis is suspended.

Applications of heat and cold have their advocates. Both tend to relieve pain somewhat. Heat may be applied by poultices, electric heating pad or hot-water bottle.

A variety of drugs is still used, preparations of guaiacol, of ichthyl, applications of lead and opium lotion, wet dressings of aluminum acetate or magnesium sulphate solution employed with or without the use of the therapeutic lamp, being the favorites.

The time required to stay in bed depends upon the severity of the case. Ordinarily from seven to fourteen days are necessary, while some patients require three weeks or more depending upon the amount of involvement of the epididymus. One should not make the mistake of allowing the patient to get up too soon as an exacerbation of the inflammation will result. All patients should wear a suspensory on getting out of bed to keep the cord relaxed.

Although comparatively little has been said concerning the surgical treatment of epididymus during the past five years, one is

particularly impressed with the growing popularity of the open operative method. During the war, for example, where excellent opportunity was afforded for group study, some army surgeons were even going so far as to advocate the Hagner operation in all cases.

From some "Notes from China," appearing in the *Lancet* of July 1, 1922, we learn that "The civil warfare which has been waged round Peking has emphasized the levity as regards many important details of organization with which opposing Chinese generals pit their armies against each other. The right flank of the Manchurian troops was turned by the Chih-li army mainly because of lack of ammunition; the reverse spread all along the line and developed into a rout. There are no returns available as to the number of killed and wounded, but over 600 of the latter were literally 'dumped' in Peking and became dependent on the philanthropy of foreign hospitals, as owing to lack of funds, the big military hospital was closed some months ago. Beyond the application of first field dressings, there was little or no attempt at splinting of fractured limbs or other ambulance or casualty hospital treatment. Quite a large number of rifle bullets were extracted in the unexpanded state, and what at first sight looked like penetrating wounds of the chest were frequently found to be cases where the bullet had run round the chest wall. In many instances, as in the thigh, the bullet had been deflected by the bone without fracturing it. This was due to the age of the cartridges (much of the ammunition dating from 1905), and to the long range of fire by which a good number of casualties were the result of spent bullets. The Chinese soldier makes a stoical patient; he readily submits to operation, and being as a rule 'as healthy as a horse' he has high recuperative powers. As a rule he is a vegetarian and a total abstainer; only exceptionally does one find a carious tooth in his otherwise perfect set of teeth, and the long hours of drill help to make him physically a healthy specimen of manhood with healing powers that are better than those of the average European soldier.

"The want of medical arrangements has been fortunate for the troops, in that it brought many of them under the hands of British, American, and French medical men who have returned to China rich in military surgical experience gained during the war, and have freely given their services. On occasions such as this a striking comparative object lesson can be gained on the splendid way in which our wounded were treated. Lack of compensation for wounds, lack of provision of artificial limbs or of convalescent treatment, or indeed of any solatium for the physical injuries received in doing his duty, make the lot of the Chinese soldier unenviable from the European point of view."

"It is the penalty of a long and peaceful old age that the achievement of a great man's activities may be forgotten," remarks an editorial writer in the *Lancet* of July 1, 1922, when referring to Louis-Antoine Ranvier, who was born at Lyon on October 2, 1835, and died March 22, 1922, at Thely (Loire), where he retired many years ago after completing his life's work at the College of France.

"After completing in the year 1860 his medical education in Paris he devoted his attention to pathological anatomy, and with his friend Cornil founded a private laboratory in the Rue Christine, a small street off the Boulevard St. Michel, whence was issued a textbook of pathological histology, which became classical. Ranvier then turned his attention more and more to normal histology, and in 1867 became assistant to Claude Bernard, who secured for him the first appointment to the newly founded chair of general anatomy at the College de France. Until the time when he reinvestigated the structure of medullated nerve fibers it was assumed that the medullary sheath, or white substance of Schwann, formed a continuous envelope or sheath round the axis cylinder. In 1871 Ranvier showed that the medullated sheath, or myelin, is entirely interrupted at regular intervals along the whole course of the peripheral nerve fibers, now universally known as Ranvier's nodes. It is, however, remarkable that Ranvier himself failed to notice the incisures in the medulla, which break it up into cylinder cones, a discovery made later by Schmidt and Lautermann.

"Further studies in connective tissue, blood vessels, and lymphatics enabled Ranvier to complete our knowledge of peripheral nerve trunks. He also added to the sum of knowledge concerning non-medullated fibers, fully describing the lamellated character of the perineurium, which he called the lamellar sheath, the number of lamellæ lined by endothelium being about 10-12. Turning his attention in 1872-73 to the degeneration of nerve fibers after sections, Ranvier described the histological changes included under the term 'Wallerian degeneration.' He was amongst the first to recognize that in the regeneration of nerve fibers growths of the axis cylinder are pushed out from the central segments. In 1875 came the demonstration that the medullated fibers of the central nervous system have no nodes and are not provided with the sheath of Schwann. The latter is usually continued beyond the last node of the fibers of the spinal roots and accompanies the nerve fiber until it pierces the pia mater and then disappears in the neuroglia surrounding the cord. No nucleus is present in the last interannular segment furnished with a sheath of Schwann. In 1885 Ranvier resolved the intimate structure of the neuroglia itself. In 1882 he solved the relation of the nerve fibers of spinal ganglia in mammals to the nerve cell. The

emerging fiber divides at a node, sending a branch toward the center and one toward the periphery. Following naturally on these studies came those on the terminations of nerve fibers in muscles, striped and smooth; in sensory surfaces, cornea, skin, and in electrical organs. In 1869, by the simple method of interstitial injection of a suitable fluid under the skin, he produced an artificial œdema, and in this way was able to unravel the relations of the connective tissue cells to the fibrous elements of the tissue and to disprove the views of Virchow on the connective tissue corpuscles. He contributed greatly to our knowledge of the structure of the vascular system—including the arrangement of smooth muscle in arterioles, the structure and morphological significance of the fibers of Purkinje, the valves of veins, and the formation and signification of the fibrin network. Perhaps the most compact piece of his work was an elegant contribution on lymph hearts. The development of blood vessels and red blood were successfully studied in the 'taches laiteuses,' or milk spots in the omentum of the young rabbit, and the knowledge thereby obtained and of the vaso-formative cells has become an integral part of histology. In his observations on the glandular system Ranvier corrected some results of Heidenhain. To him we owe the division of secretory glands into merocrine and holocrine glands. He studied the morphological changes in vivo under the microscope, and established fundamental views on the mechanism of secretion. With Cornil he was the first to show the glandular atrophy that follows ligature of the excretory duct in the submaxillary gland. After the manner of his master, Claude Bernard, Ranvier published his lectures for several successive years. These and many subsequent publications embodied much original work. He was a master of technique and the keynote of the whole was simplicity and accuracy in detail. He took the tissues and organs that lay ready to hand and studied them with a seeing eye and a penetrating brain. In his great work, 'Traite technique d'histologie' (1875-1882) lie enshrined his methods and his main results."

Writing in the *Archives de Médecine et Pharmacie Navales* of June, 1922, on "Seasickness and atropine," Doctor Bassé, of the French Navy, reports the good results obtained by using atropine administered by hypodermic. As a preventive he finds that a dose of 1 milligram is nearly always sufficient. As a curative procedure he employs an initial dose of 2 milligram which generally gives relief in from 20 to 30 minutes. A dose of 1 milligram should be given for several days following the initial dose if indicated. The writer states that he has never observed disturbance of accommodation following this treatment. He is of the belief that the neurotic

individual who acquires seasickness through suggestion will receive little benefit from this treatment. Atropine by mouth will not produce the results desired; the drug must be given beneath the skin.

The following remarks made by the fleet surgeon of the Pacific Fleet and appearing in a recent number of the Fleet Medical Bulletin, although addressed to the medical officers serving in the Pacific Fleet, may be read with profit by all naval medical officers:

"A FEW THOUGHTS ON KEEPING ONESELF PROFESSIONALLY SMART.

"In past bulletins something has been said about hospital corps instruction—the means to making its members of fullest professional value in their present stations and ultimately to the service, say nothing of the personal gratification and advantage of efficiency to themselves. A few words of similar import addressed to medical and dental officers of the fleet may not be taken amiss, for the idea is quite in keeping with our individual and corps ambitions and the inspiring leadership toward higher standards, in both example and precept of our chief.

"There is much in service afloat on all but hospital ships, which is vastly important and legitimately preoccupying at the expense of the strictly and narrowly professional, but the sea is the paramount field of naval activity to which all other naval activities are merely contributory, and it is here that we learn the breadth and focus of our responsibilities. Numerous and diversified as our medico-military duties are, their efficient performance is as dependent upon a fundamental professional competence as the science of navigation or gunnery upon mathematics, and the need to keep abreast of the times is therefore insistent. This is a consideration quite aside from the fact that if we do not hold our professional sense and abilities alert and keep in touch with medical progress, against the opportunity for their pointed exercise, we will certainly fall hopelessly behind.

"These perhaps may be accounted simple truths, but in our recognition of them, and in our efforts to combat the influences to professional laziness, and in our efforts, moreover, to realize our best possibilities, do we make the utmost use of the facilities within our reach or at our command? It is true that in the very nature of the case—of our situation aboard ship—the demand for purely medical or surgical work is at a minimum and that this circumstance is appreciably accentuated by the presence of hospital ships. It is true, also, that not all of the facilities for professional refreshment are easily or constantly available. But this is rarely otherwise even ashore, and that there is no royal highway to success is an ophorism universally true. We have got to be alive and determined in this

direction, and it will usually, if not invariably, be found that commanding officers are interested in furthering the initiative of their officers in all that makes for development and progress.

"The resources available to medical officers of the fleet at San Diego, Los Angeles, San Francisco, and Seattle have been presented in previous fleet medical bulletins. Have we utilized this information as fully as possible?

"The hospital ship is at hand much of the time and offers a concentrated medical atmosphere of high professional standard in which each ship of the fleet has a direct interest in the persons of patients transferred. Presumably these are our most serious and interesting cases. Do we follow them up after their transfer for humane as well as professional reasons; do we individually and personally profit as fully as we should by the professional activities on the hospital ship? Her officers are glad to have us attend their clinics and are prepared to give as much time as desired to discussing their cases and work with visiting officers. Prospective operations have been announced to ships present by the fleet surgeon.

"Finally, there are the medical journals. These publications are the couriers of medical progress. Do we give as much time to them and read them as carefully as we should? In spite of all there is to be done on board ship in the way of medical and sanitary work and instruction and drills, etc., there is abundant time for reading which should be devoted, in the main, to worth-while stuff and not frittered away either in aimless occupation or trivial literature. There will be enough time left for reaction purposes, the importance of which is fully appreciated. I am only concerned with the profitable, enjoyable, and gratifying employment of other than those purely leisure hours which are given to healthful and otherwise necessary diversion. The question of 'How to live on 24 hours a day' is worth studying, and 'library browsing' should constitute an important part of the program. With a paucity of patients and a plethora of time this is the opportunity to acquire or renew the habit of library browsing, which, aside from its educational value, will develop the professional strategy spoken of by Ashurst."

NURSE CORPS.

CARE AND TREATMENT OF TUBERCULOSIS PATIENTS.

By DELLA U. KNIGHT, Chief Nurse, United States Navy.

I had the privilege of attending a course of lectures on tuberculosis, held at the United States Veterans' Hospital, Oteen, N. C., during the month of June, 1922. These lectures were given by physicians who have made a very extensive study of tuberculosis and by members of the nursing profession who had specialized in caring for tuberculosis patients. One of these physicians stated: "Tuberculosis is the biggest thing in medicine." Another said: "Tuberculosis in the early stages is the most curable of all diseases." With these two great initial statements, interest and enthusiasm ran high during the entire course.

It has been authoritatively stated that "Tuberculosis has a psychology of its own." Very early in my five years' association with tuberculous patients, in hospitals for the treatment of this disease, I was much impressed by the truthfulness of the above statement. The cheerfulness and hopefulness so often referred to as characteristics of persons afflicted with tuberculosis are to be found in advanced cases only; quite the opposite being true of incipient cases. This class is marked by a depression which retards recovery and in many cases makes recovery impossible. The worried, unhappy patient seldom improves; therefore in the incipient cases particularly the importance of including the mental condition in the treatment of the disease can not be overstressed.

The psychology of tuberculosis no doubt has its beginning the day the patient is informed that he has this much dreaded disease. I have heard the questions: "What did the doctor say when he told you that you had tuberculosis?" and "What did you think when the doctor told you that you had tuberculosis?" asked and answered by patients many times. The answers to these questions convinced me that there is no way in which this information can be presented to a patient without causing some shock. It may be told in the most kindly, sympathetic way, which, of course, is appreciated, but even this presentation does not remove the feeling of the prisoner at the bar being pronounced "Guilty." The response to this shock depends upon the environment of the patient and the treatment he receives.

A physician who has had a very extensive experience with tuberculous patients states in connection with taking their history that they do not tell facts. This is true; but evasion of facts by the patient is not intended to deceive the physician; it is a more or less unconscious desire to deceive themselves, since back of this mental process is the element of fear—fear of the disease, fear of death; and (on account of the stigma attached to the disease and the handicap in earning a living) I may add: *Fear of living*. It must be very satisfactory to the medical profession and to institutions organized for the prevention and treatment of tuberculosis to know that the death rate from this disease has decreased nearly one-half in 17 years. This fact, however, does not give much consolation to the tuberculous patients who think little about statistics but much about their own prognosis and the readjustment of their lives to conform to their physical condition.

About 10 years ago an ex-Navy nurse who was engaged in public health work, and whose duty it was to report all tuberculous cases and insist upon their going to a sanatorium for treatment, found that in many cases (especially the breadwinners of families) the distress at being separated from their families, leaving them without support, was so great as to counteract any benefit they might receive from the treatment. She presented this matter to those in authority without effect. Rather than follow a course which she believed to be wrong, she resigned her position. Time has proven her conviction to have been well founded, as I am told by nurses engaged in public health work now that for the reasons given by the above-mentioned nurse patients are treated in their homes and satisfactory results are obtained. In some cases men continue their work. By spending all their time at home in bed at absolute rest, even having their meals served to them in bed, and given as much fresh air as possible, they have made much improvement.

What began as a passing thought in my early association with tuberculous patients developed into a conviction as my experience with these patients continued; so it was with great interest that I listened to the instructors at Oteen emphasize the importance of the mental condition being included in the treatment of the disease.

The first lecture was given by Doctor Beardsley, United States Public Health Service, on duty at Oteen, subject, "Ward routine." Doctor Beardsley's ward was considered the model ward. During the month I visited nearly all the wards of the hospital. I found all wards clean, apparently well managed, patients well cared for, and seemingly an atmosphere of contentment prevailed. But Doctor Beardsley's ward excelled in some undefined way. The great personal interest of the doctor in each patient, the devotion of the patients to the doctor, the cheerful loyal cooperation of the nurse in her

untiring efforts to maintain a cheerful, happy atmosphere so necessary in the treatment of tuberculosis, no doubt helped to make this a model ward.

Notes from lectures by Dr. C. L. Minor.—“Tuberculosis patients can not be treated in groups or as ‘cases.’ They must be treated as individual human beings. Doctor must talk to patients in private, not even a nurse present, and encourage patients to tell all their worries. In no other disease is the relation between mind and body so much to be considered. All personal affairs must be looked into, the psychic life of the patient, personality, social status, etc. The mind must be treated as well as the body. The nurse is a great help in obtaining information concerning patient’s worries. She must encourage confidence in the doctor and obedience to his orders; she must have not only the confidence but the affection of the patient. Mothers are often a handicap in the treatment while sisters and aunts are often helpful. The cruel dread of infection (phtisiophobia) on the part of relatives and friends is harmful. Some patients are unable to adapt themselves to a crowd, others need cheerful companionship. Stage of disease and social condition determines association. Cheerfulness is the keynote of the cure. The doctor and nurse must be optimistic. This irradiating of optimism, cheerfulness, and interest on the part of those in authority will make an optimist out of a pessimistic patient. Quick temper, loss of will power, and irritability are characteristics of incipient cases and must be counterbalanced by the attitude of those who come in contact with the patients. The patients must be guided and encouraged and cheered. There is no such school of character building as tuberculosis bravely met by patient, doctor, and nurse.”

Miss Alice Stewart gave several interesting talks on the work of the National Association for the Prevention of Tuberculosis, especially in connection with the educational program of that association. Miss Elizabeth Cannon, instructor in public health nursing at the University of Pittsburgh, and who had charge of the nurses detailed for class work at Oteen, gave much valuable instruction in public health nursing. Her lecture on “Tuberculosis nursing in the home” was very interesting to all, but especially to the nurses engaged in “follow-up” work for the Veterans’ Bureau.

Dr. Nathan Barlow, of the United States Public Health Service, gave several very interesting and instructive lectures. In his presentation of the “Treatment of tuberculosis,” he also mentioned the importance of considering the mental condition of the patient in the treatment of the disease; emphasizing that this part of the treatment should begin with the officer of the day and the nurse in the receiving ward. The ward physician would have difficulty in gaining the confidence of a patient whose reception had been: “What

is your name? Where are you from?" (rings bell for the orderly; orderly appears). To orderly: "Here is another one; take him to ward 1." Patient arrives in ward 1. Nurse: "Put him in bed 23." Instead of flaunting to the patient the glaring sign: "Abandon hope, all ye who enter here," the patient should be made to think that he is the right patient in the right hospital; that he will receive the best treatment from the right doctors and the best care from the right nurses. With such a reception and continued treatment based on mental and physical need, a cure is almost assured.

Robert W. Service, who knew so well the demands of the game, ends one of his stimulating short poems with these words which will help the sick and the well in their struggle with this dread disease:

You're sick of the game! Well, now, that's a shame;
You're young and you're brave and you're bright.
You've had a raw deal? I know, but don't squeal.
Buck up, do your damndest, and fight.
It's the plugging away that will win you the day.
So don't be a plker, old pard;
Just draw on your grit; it's so easy to quit;
It's the keeping your chin up that's hard.

THE HARBOR FROM MY WESTERN WINDOW.

By SARA B. MYER, Chief Nurse, United States Navy.

New York Harbor—a name to conjure with! As I see it now before me and gaze upon the varied beauty and constantly shifting activity, I think of the many years spent elsewhere and memory flashes the old line "The place of my dreams—realized."

The harbor viewed from the ridge in Brooklyn under a summer sky swept by the northwest wind! A painter's brush could convey the impression which the pen may fail to give: The sky of deepest blue, and the billowy snowy clouds are reflected in the waters which are tossed by the breeze into fascinating tiny white caps. The "upper bay" is crowded with the shipping of many nations: As far as the eye can reach are the anchored tramp freighters and among them ply the busy shore resort steamers and the fast little ferry boats, while out in the deep channel the great liners glide with dignity and grace as they go out to sea or return from foreign shores to dock at the Manhattan and Hoboken Piers.

On her island, "out beyond" towers the Statue of Liberty against the distant sky; while far to the west across the bay and behind the lady with the torch I see the long low line of the Jersey shore. The great railroad terminals on this shore are almost hidden by the mist, but how little the lure of color in that mist this mere state-

ment conveys! To veil so much utility in the entrancing shades of lavender and gray is one of the atmosphere's greatest effects. To the left lie the bluish hills of Staten Island bounding the bay and the view to the south. Sweeping the gaze again to the right gives me that far-famed group, the tall structures and steeples of Manhattan. The East River and the old bridge are so dimly visible that here, too, the enchantment of softly colored haze entrances the eye, but makes the pen falter in its effort to visualize the scene. Along the Brooklyn shore lie the long covered piers where the great ships are docked. I can watch their decks seething with activities: The many hued stacks and the strange flags give bizarre coloring to this near-by scene. And then is the thrill which comes from sharp contrasts as the eye leaves the huge ocean steamers to rest on the old scows loaded with coal, lumber, and merchandise. Here, too, ply the busy, noisy little tugs, emitting much black smoke in their efforts to pass rapidly in and out—but how quickly the magic of the atmosphere changes the black smoke to colorful low-hanging clouds.

Laden trucks come to and go from the wharves. It is sailing day and people throng the docks; coming on foot and in taxis which appear to roll drunkenly with the high-piled luggage and which disappear, weirdly, through huge doors. I watch the hurried motions of the travelers and I sense the anxious care; their hopes and fears.

Many thoughts cross my mind as I gaze from my window over this harbor, whose waves lap the tip of Manhattan, and about whose shores are crowded the homes of millions, and the concentrated business of America. Depression engulfs me as I gropingly sense the enormity my view represents, and I am seized with an overpowering desire to escape engulfment. Those red curving lines which the eye almost nurses—they offer help. These are the roads which lead away from the seething harbor to the sweet country beyond. There are others who need an escape from this frightening fascinating city view and a week-end trip on four-wheeled air, the means of escape: Away, away across the States, past villages, sleepy and quiet; past country homes where "peace and plenty mark the spot"; past orchards and ripe grain fields; to the hills and river where man has not yet builded a city.

On Monday morning I return to my routine work at the harbor side, with its color and its pressure of teeming life—and the fascinating view from my window.

Miss Kate Madden, R. N., directress of nurses, the Brooklyn Hospital, Brooklyn, N. Y., contributes the following short article on

24205—23—9

"The care of rubber goods" to the Modern Hospital for August, 1922:

"Rubber articles are destroyed so easily and deteriorate so quickly that too large a stock on hand (especially gloves) is to be avoided. They should be kept in a dry, cool place, as exposure to heat and moisture tends to destroy the rubber, shortening its life. They should be protected from the action of fats and acids by careful washing to remove materials used for lubrication, etc. Rubber sheets and pillowcases when not in use should be hung on a bar; never folded. We have such bars in every ward; they are 8 feet long, to allow the sheets to hang out straight.

"The marking of rubber articles is important; all new articles, except gloves and rubber dam, are marked for the ward they are issued to in the storeroom. Sheets and pillowcases are stamped on the border. Hot-water bottles, ice caps, and air rings have metal tags, which are not easily removed. This careful marking enables us to place the responsibility for carelessness or misuse of the article and tends to prevent that bane of hospital existence, borrowing.

"*Rubber sheets* are washed with 2 per cent carbolic, scrubbed with soap and water, rinsed and dried, hung on bar, and covered with a cotton sheet.

"*Air rings* are washed with 2 per cent carbolic, scrubbed with soap and water, dried, partly inflated, and hung on a bar which can be lifted at end.

"*Hot-water bottles* are washed, drained out well, dried, inflated, top inserted, and hung up.

"*Ice caps* are drained, washed, dried inside and out, a piece of gauze placed inside to prevent cutting of the rubber, inflated, top screwed in, and hung up.

"*Rubber dam* is soaked in 2 per cent carbolic for half an hour, scrubbed with soap and warm water, rinsed, dried, powdered, and rolled.

"*Rectal tubes, catheters, tubing, drains, etc.*, are wiped off with tissue paper, washed with cold water to remove all adherent matter, washed with warm water and soap to remove lubricant, rinsed, placed in boiling water for two minutes, immersed in cold water, dried, hung up to drain, put away in large sheet glass jars, in which they are carefully coiled.

"*Rubber gloves*.—Our custom is to give new gloves, except in special cases, only to the operating rooms, the maternity delivery rooms, and the laboratories; mended gloves are furnished the wards. The routine care of gloves, mended and new, all over the hospital is as follows:

"New gloves are boiled in normal saline for five minutes; they are thoroughly dried on both sides, powdered, put in glove cases.

and sterilized in an autoclave under 15 pounds' pressure for 10 minutes. A puff of cotton with extra powder is sterilized with each pair of gloves. After use, gloves are washed with cold water, immersed in lysol 1 per cent for 20 minutes, tested for leaks, dried, mended if necessary, powdered thoroughly on both sides, and put in glove cases and sterilized. As much of the wear of gloves is due to tearing when they are put on, the wrists are turned back, and when the hand is inserted into the glove the other hand is slipped under this turn-back wrist and the glove is gently pushed on over the hand. This serves two purposes—it prevents tearing of the glove and keeps the fingers of the other hand clear.

“Our glove cases are made of unbleached cotton, fairly heavy, and are cut 36 inches long by 18 inches wide. This case is lined with one layer of sheet wadding, turned in and finished all around, and stitched across from each corner to hold the wadding. They are folded to form a double pocket, not quite meeting in the center; when finished they are 16 inches long and 9 inches across the pockets. We find they protect the gloves, stand washing and sterilizing very well, and wear for a long time.

“Hard-rubber articles are kept in bichloride 1:200 and are boiled only in special cases.”

DIGEST OF DECISIONS.

The following correspondence is of interest in relation to the question of discharge for physical disability of an enlisted man who has served more than 12 but less than 16 years.

26254-3591 : 3

DEPARTMENT OF THE NAVY,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, 29 August, 1922.

From: The Judge Advocate General.

To: The Chief of the Bureau of Navigation.

Subject: Provisions of the act of July 1, 1922, relating to the reduction in the number of enlisted personnel of the Navy.

Reference: (a) Your letter of August 16, 1922 (N-631-KLC:LLK).

1. In reference (a) an opinion is requested as to whether the Bureau of Navigation is authorized under the provisions of the act of July 1, 1922 (Pub. No. 264, 67th Cong.) to effect the discharge for physical disability incurred in the line of duty of an enlisted man who has served more than 14 years in the naval service.

2. The particular provision of said act affecting this case applies only to enlisted men of the Navy who have served more than 12 years and less than 16 years, but an examination of all the provisions of said act relating to the reenlistment of men in the Navy discloses that the provision relating to enlisted men who have served not less than 25 years is to the same effect. It is believed, therefore, that the true meaning of these provisions can best be obtained only by considering them collectively as well as singly. The provisions under consideration are the following:

"Immediately upon the approval of this act the Secretary of the Navy shall begin to reduce the enlisted strength of the Navy, by furlough without pay (and no funds shall be required of men so furloughed), discharge, or otherwise, under such regulations as he may prescribe, without regard to the provisions of existing law governing discharges, so that the average number of enlisted men, including six thousand apprentice seamen, shall not exceed eighty-six thousand during the fiscal year 1923: *Provided*, That enlisted men who have served not less than twenty-five years shall, unless sooner discharged by sentence of court-martial, be permitted to reenlist and continue serving until they are eligible for retirement after thirty years' service as now provided by law: *Provided further*, That enlisted men of the Navy who would be eligible under existing law for transfer to the Fleet Naval Reserve after sixteen years' service at the expiration of the current enlistment in which serving, or who have completed sixteen years' service, may be transferred to the Fleet Naval Reserve at any time after the passage of this act in the discretion of the Secretary of the Navy, and shall, upon such transfer, receive the same pay and allowance as now authorized by law for men transferred to the Fleet Naval Reserve at the expiration of enlistment after sixteen years' service: *Provided further*, That enlisted men of the Navy, who have completed eighteen

years' service, may be transferred to the Fleet Naval Reserve at any time after the passage of this act in the discretion of the Secretary of the Navy, and shall upon such transfer receive the same pay and allowances as now authorized by law for men transferred to the Fleet Naval Reserve after twenty years' service: *Provided further*, That enlisted men who have served for more than twelve but less than sixteen years shall be permitted to reenlist and continue serving, unless sooner discharged by sentence of a court-martial, until they have completed sixteen years' service, whereupon they shall, upon their own application, be permitted to transfer to the Fleet Naval Reserve: *Provided further*, That no enlisted man of the Navy shall be transferred to the Fleet Naval Reserve unless they have completed sixteen or twenty years' service, after the Navy is reduced to the number of enlisted men appropriated for in this act, and in no event after January 1, 1923: *Provided further*, That the enlisted men who have served less than twelve years found to be in excess of the total number herein appropriated for, after all other deductions have been made by way of retirement or transfer, shall be discharged or furloughed without pay for the convenience of the Government, and all recruiting shall be discontinued until the total number of enlisted men has been reduced to the number herein appropriated for."

3. In considering said provisions collectively, it is noted that the Secretary of the Navy is required to begin, on July 1, 1922, to reduce the enlisted strength of the Navy so that the average number of enlisted men therein during the fiscal year 1923, including 6,000 apprentice seamen, shall not exceed 86,000. It is further noted that for the purpose of making said reduction the enlisted personnel has been divided into two groups, namely, those enlisted men who had served more than 12 years to that date and men who had served less than 12 years.

4. The reductions required by these provisions shall first be made by the Secretary of the Navy by way of retirements or transfer to the Fleet Naval Reserve of those enlisted men eligible therefor. After said retirements and transfers have been made from the group who had served more than 12 years on July 1, 1922, the Secretary of the Navy is authorized to reduce the number of enlisted men with less than 12 years' service on that date who are found to be in excess of the 86,000 therein appropriated for, by furlough without pay, discharge, or otherwise, without pay, under such regulations as he may prescribe without regard to the provisions of existing law governing discharges.

5. For the purpose of expediting said reduction by way of transfer to the Fleet Naval Reserve, these provisions further authorize enlisted men who would be eligible under existing law for transfer to the Fleet Naval Reserve after 16 years' service at the expiration of the current enlistment in which serving, or who have completed 16 years' service but whose enlistment has not expired, to transfer to the Fleet Naval Reserve with the pay and allowances of men transferred at the expiration of enlistment after 16 years' service, as authorized by law prior to July 1, 1922.

6. Enlisted men who had completed 18 years' service on July 1, 1922, are also authorized to transfer to the Fleet Naval Reserve and receive the pay and allowances of men transferred thereto after 20 years' service. Under the provisions of this act, however, these transfers may not be made after the number of enlisted men has been reduced to 86,000, and in no event after January 1, 1923. Said provisions, however, do not prohibit transfers to the Fleet Naval Reserve after 16 or 20 years' service, as authorized by law prior to July 1, 1922.

7. Enlisted men who had completed not less than 25 years' service on July 1, 1922, are permitted under these provisions to reenlist and continue serving, unless sooner discharged by sentence of a court-martial, until they are eligible

for retirement after 30 years' service, and enlisted men who had served more than 12 years but less than 16 years prior to July 1, 1922, are also permitted to reenlist and to continue serving, unless sooner discharged by sentence of a court-martial, until they have completed 16 years' service, whereupon they shall, upon their own application, be permitted to transfer to the Fleet Naval Reserve and receive the pay and allowances of men transferred to the Fleet Naval Reserve at the expiration of enlistment after 16 years' service, as authorized by law prior to July 1, 1922. In other words, enlisted men whose total service on July 1, 1922, was not less than 25 years are to be permitted to reenlist and continue serving until the full 30 years of service has been rounded out, without reference to the reduction in the enlisted strength required by the provisions of the act of July 1, 1922, unless through misconduct of a character warranting a bad-conduct discharge or dishonorable discharge from the service they, in fact, lose said right. The same applies to enlisted men whose total service on July 1, 1922, was more than 12 years but less than 16 years.

8. The foregoing presents the question of whether or not enlisted men of the Navy whose total service on July 1, 1922, was not less than 25 years, or whose total service on that date was more than 12 years but less than 16 years, may be discharged from the service on account of physical disability. From a careful examination of these provisions, this office is of the opinion that enlisted men who have served not less than 25 years, and those who have served more than 12 years but less than 16 years, can not be discharged from the service except by the sentence of a court-martial until they have been permitted to round out 30 years and 16 years, respectively, but that they must be reenlisted and permitted to continue serving, regardless of physical and other qualifications, except misconduct such as would warrant their discharge from the service by sentence of a court-martial.

9. The foregoing conclusion is amply supported both by a reasonable construction of the particular provisions relating to these groups of enlisted men and also by the general tenor of the provisions of the act relating to enlisted men of the Navy who had to their credit more than 12 years' service on July 1, 1922. For example, it has been repeatedly held by the courts that when a statute directs a thing to be done in a given manner, said direction automatically "changes all other modes of performing that act" (U. S. v. O'Connor, 31 Fed. 452). In that case the court stated in the course of its opinion that when a "statute directs" that a "public record shall be kept for a certain purpose and that entries shall be made therein in a certain way, it seems obvious that it is unlawful to make entries in such record in any manner other than that prescribed." Likewise, in the case of *Walla Walla v. Walla Walla Water Co* (172 U. S. 22), it was held to be a general principle of statutory interpretation that the mention of one thing implies the exclusion of those things not mentioned. (See also 6 Pet. 725; 12 Wall. 271.)

10. Applying the above decisions to the provisions of the act under consideration, it is noted that the only condition under which enlisted men of the Navy with not less than 25 years of service to their credit on July 1, 1922, and enlisted men who on that date had served more than 12 years but less than 16 years, may be discharged from the service is by sentence of a court-martial. The inclusion of this single provision under which said enlisted men may be discharged from the service clearly excludes discharges in any other manner, such as for physical disability.

11. In the case of *Pennington v. Coxe* (2 Cranch 52), which has been reaffirmed by a number of decisions since that date, Chief Justice Marshall stated "that a law is the best expositor of itself; that every part of an act is to be taken in view for the purpose of discovering the mind of the legislature." It

will be noted from an examination of the provisions of said act relative to the conditions under which the enlisted strength of the Navy shall be reduced to 86,000 men by the Secretary of the Navy prior to January 1, 1923, that enlisted men who have served more than 12 years are especially favored, and that enlisted men who have served not less than 25 years and enlisted men who have served more than 12 years but less than 16 years are to be retained in the service regardless of said reduction. In other words, it is apparent from an examination of these provisions, when considered collectively, that Congress intended that enlisted men who had to their credit more than 12 years' service on July 1, 1922, should be permitted either to transfer immediately to the Fleet Naval Reserve under certain conditions, or to reenlist in the service and to continue serving until they are in a position to transfer to the Fleet Naval Reserve after 16 years' service, and thereby obtain virtual retirement, or after they have served not less than 25 years to reenlist and to continue serving until they are in a position to obtain actual retirement after 30 years' service. The only exception in the case of enlisted men who are to be permitted to reenlist and to continue serving is when they have so conducted themselves as to authorize their discharge by sentence of a court-martial.

12. Such provisions of said act providing for the reduction of the enlisted men of the Navy as affect enlisted men who had more than 12 years' service to their credit on July 1, 1922, are obviously of a beneficial character. In the case of *Beley v. Naphtaly* (169 U. S. 359), it was held that a remedial statute must be construed liberally so as to afford all the relief which the language of the act indicates that the legislature intended to grant. (See also *Jones v. Guaranty, etc., Co.*, 101 U. S. 626; *Ross v. Doe*, 1 Pet. 667; *In re Matthews*, 109 Fed. 619.)

13. Applying these decisions to the provisions under consideration, this office is of the opinion that the beneficial character of these statutes is such as to exclude discharges from the naval service except by sentence of a court-martial in the cases of enlisted men who had not less than 25 years' service to their credit on July 1, 1922, and enlisted men who had to their credit more than 12 years but less than 16 years' service on that date.

14. Answering more especially the question presented, you are advised that in the opinion of this office enlisted men in the Navy who had to their credit on July 1, 1922, more than 12 years but less than 16 years' service shall be permitted to reenlist and to continue serving until they are eligible for transfer to the Fleet Naval Reserve after 16 years' service without reference to their physical or other qualifications.

J. L. LATIMER.

Approved, August 29, 1922.

T. ROOSEVELT,

Acting Secretary of the Navy.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.
Lieutenant Commander H. E. HARVEY, Dental Corps, United States Navy.

"A library is the scholar's workshop; it is the teacher's assistant; it is the professional man's chief outfit."—Baldwin Booklover.

THE TREATMENT OF FRACTURES, WITH NOTES UPON A FEW COMMON DISLOCATIONS, by C. L. Scudder, M. D., consulting surgeon to the Massachusetts General Hospital. Ninth edition. W. B. Saunders Company, 1922.

For 22 years Scudder's Treatment of Fractures has been an authority in this special branch of surgery, and no words of the reviewer can make it more popular or any better known. It is seven years since the last edition of this book was printed, during which interval the surgical experiences of the World War have contributed definitely to the advancement of the civil surgery of fractures.

Among these contributions, which are considered in their proper places in the new edition, may be mentioned—The Carrel-Dakin treatment of infected wounds, by which potentially septic and septic compound fractures may be controlled; the recognition of the importance of skilled immediate treatment of recent fractures—i. e., the recognition and proper treatment of shock, the first-aid dressing, transportation, the minimizing of trauma and the emergency traction and immobilization; the universal acceptance of the Thomas splint and the principles of its use; the acknowledgment that the indirect and direct traction principle is capable of effectively cor-

recting shortening in fractures of the long bones; the establishment of the safety and efficiency of direct bony traction, especially in fractures of the long bones of the lower extremity; the recognition of the necessity for an X-ray examination of every fracture; the revolt against the general use of metallic sutures and plates; the adoption of the suspension of fractures of the extremities; the necessity for the early active movements of joints contiguous to the fracture; the value of active as distinguished from passive movements of joints and the adoption of the early active movement of septic joints; the establishment of the Whitman method of treating fractures of the neck of the femur as the method of choice.

The war, furthermore, demonstrated the necessity of the segregation of patients with fractures in special wards, where they may be treated primarily and at as early a date as is possible by surgeons interested in and trained in traumatic surgery, and emphasized the need of the organization in general hospitals of fracture services with a permanent personnel and much team work, which necessity the author hopes to see generally recognized at an early date.

As in former editions, the chapters on the special fractures and their treatment are supplemented by chapters on the operative treatment of fractures, pathologic fractures, anatomic facts regarding the epiphyses, gunshot fractures of bone, the Röntgen ray and its relation to fractures (by E. A. Codman, M. D.), the ambulatory treatment of fractures, and the notes upon a few dislocations.

The war forced upon our attention the fact that the employment of plaster of Paris in the treatment of fractures is "a bit old-fashioned;" still many fractures of the upper and lower extremities may, at some period, very properly be treated by the plaster-of-Paris splint, so the author devotes a chapter to the use of plaster of Paris.

Excellent photographic illustrations demonstrate the proper application of the various apparatus employed in the modern treatment of fractures and proper methods of the examination of fractures. Numerous X-ray pictures reveal the condition present in the various fractures considered by the author.

The book stands as a classical work in its especial field and should be in the library of every surgeon whose practice brings him in contact with traumatic surgery. (W. M. K.)

DISEASES OF THE SKIN, by Henry H. Hazen, A. B., M. D., professor of dermatology in the medical department of Georgetown University. Second edition. C. V. Mosby Company, St. Louis, Mo., 1922.

In writing this book, the author aimed to produce a work suitable for the needs of the general practitioner who, as a rule, finds any of the numerous large works on dermatology too voluminous and containing such a wealth of material that the inexperienced reader has

difficulty in grasping the essential facts. The work, which is largely based upon experience acquired by the author while serving as assistant in dermatology in the Johns Hopkins University, contains adequate descriptions of the common skin diseases and the treatment recommended is that which the personal experience of the author has proven satisfactory.

Years of practice in Baltimore and Washington have given the author of this work exceptional opportunity to observe the manifestations of skin disease as they occur in the negro and the book reflects this special study of the subject of skin diseases in the colored race. Curiously enough, none of the textbooks upon dermatology pay much attention to the dermatologic peculiarities of the negro. According to the author the mulatto seems to be rather more susceptible to skin diseases than the full-blooded negro. Also in the negro, skin lesions have a greater tendency to become papular. The black is not so frequently affected with the congenital malformations of the skin as is the white man. Vascular nevi are rather rare, and moles are not common.

The negro skin seems to be more resistant to external irritants than is the white man's, hence the acute forms of irritant eczema are not so frequent, although the dermatitis produced by poison ivy is equally common. Sunburn, however, is not common in the negro.

A comparison of the second with the first edition of this book shows that in the preparation of the second edition practically the whole book has been rewritten and much new material has been added, bringing the volume up to date. The book is profusely and excellently illustrated by photographic illustrations which in many cases show the lesions in the negro, making it a valuable aid to physicians practicing among dark-skinned people. (W. M. K.)

PRINCIPLES AND PRACTICE OF X-RAY TECHNIC FOR DIAGNOSIS, by *John A. Metzger, M. D., roentgenologist to the school for graduates of medicine, medical department, University of California, Southern Division, Los Angeles.* The C. V. Mosby Company, St. Louis, 1922.

This is an excellent small volume on X-ray technic which should be in the working library of every roentgenologist in the Navy. In it the author has purposely avoided a discussion of the fundamentals of electricity as applied to roentgenology, and the question of diagnosis which can be obtained readily from works upon these subjects. He has aimed to "put into the hands of the student and operator a formula on which to base his work in order that he may obtain better results and thus be able to reach a more correct diagnostic interpretation," and he has succeeded in his aim to a remarkable degree.

The book contains 11 chapters and the text is interspersed with excellent photographic illustrations designed to show the proper

positions of the patient for accurate findings in the pathological conditions present. There are 61 of these illustrations and in each the patient is so carefully posed that no explanatory description is necessary to convey the author's idea to the reader. The book contains a useful glossary of electromedical terms with which, as a rule, the general practitioner is not familiar.

The first chapter deals with the laboratory, the appliances used in the practice of this specialty, and a consideration of distance time relation, current time relation, the law of densities, and the dangers of the X ray.

In the second chapter the author takes up the various stands, tables, and target adjustments, the Bucky diaphragm, and the marking of plates.

The following four chapters deal with the standardized positions for the examination of various parts of the body; chapter 7 is devoted to a special consideration of the examination of the alimentary canal and the following chapter deals with the roentgenological examination of the liver, gall bladder, and the genito-urinary tract.

In the ninth chapter stereoscopy and localization of foreign bodies is considered and the tenth is devoted to dental and oral radiography.

In the final chapter the developing-room appliances and technic are fully described. The work closes with a short paragraph on the legal right of the roentgenologist. (W. M. K.)

CLINICAL MEDICINE, THURSDAY CLINICS AT THE JOHNS HOPKINS HOSPITAL, by *Lowell F. Barker, M. D., LL. D., professor of medicine, emeritus, Johns Hopkins University, visiting physician to Johns Hopkins Hospital, Baltimore.* W. B. Saunders Co., Philadelphia, 1922.

Many advances have been made in recent years in the methods of clinical instruction in our medical schools. The lectures, quizzes, and amphitheater clinics of our student days have, to a certain extent, been replaced by service in the wards of the teaching hospital where the students, on entering upon their clinical studies, already trained in the methods and principles of the preclinical sciences—such as anatomy, physiology and pathology—begin actually to work with their teachers in the study of the patients. They become, in reality, assistants to the house officers in the wards of the hospital, to the physicians in charge of the out-patient department, and in the clinical laboratories. They take histories, make physical examinations, perform various laboratory tests, and participate in the carrying out of therapeutic plans, and thereby profit enormously by coming into direct contact with the objects of study.

We have not reached the point, however, where we are ready to discard the clinical lecture. Properly coordinated with the practical

technical training in wards, dispensaries, and laboratories, this form of instruction, when directed by a gifted teacher, is of inestimable value. Not only is the student benefited by a properly prepared clinic, but the lecturer's teaching ability is strengthened. Clinics and clinical lectures demand careful preparation by the lecturer and compel him to correlate the facts of a certain case to his knowledge of medicine as a whole. "They make a teacher more systematic and they lead him to consider the philosophy of his subject, for a lecture necessitates the directing of the attention constantly toward the essential and the universal and so acts as a healthy corrective to the narrowing tendencies of specialism."

The writer of this book, for more than 18 years, has been engaged in clinical teaching and the volume has been prepared in response to requests that reports of his clinics at the Johns Hopkins Hospital be published.

The volume opens with a clinic on carcinoma of the left bronchus in which is set forth a discussion of the principles involved in arriving at the solution of any diagnostic problem. The author sums up these principles as follows:

"First we must feel a diagnostic difficulty; second, we must collect data that will localize and more clearly define our problem; third, we must brood over the facts and allow suggestions of solution of the difficulty to occur to us; fourth, we must reason out the implications of these suggestions; and lastly, we must compare the actual facts with the implications of the suggestions to see if identity with some one of them exists, for only when identity has been demonstrated dare we accept a suggestion of solution of the problem as valid. Thus, and thus only, can we arrive at safe conclusions."

Following the introductory clinic we find 30 clinics covering a wide range of internal medicine and dealing with subjects which are of more than ordinary interest. At the end of each clinic the author has appended a selected list of references to articles in medical literature which have a bearing on the subject under discussion.

This volume is particularly appropriate to the needs of the naval medical officer at sea. With it he can pass many interesting hours and from it he may receive much instruction in the clinical diagnosis of internal disease. (W. M. K.)

A TEXTBOOK OF CLINICAL PERIODONTIA, by Paul R. Stillman, D. D. S., and John Oppie McCall, A. B., D. D. S., instructors in periodontia, Columbia University, New York. The Macmillan Co., New York, 1922.

The underlying motive for the publication of this book is the dissemination of knowledge regarding the control of periodontoclasia and to furnish a textbook for the dental student and a work of reference for the practitioner. Coming as it does from the pens of two

members of the profession who have achieved national reputation for their success in treating diseases of the peridental membrane, the book has been received with much interest. To one who is searching for knowledge of peridental disturbances, it is an intensely interesting work, well worth careful reading and study.

If psychologists are justified in their statement that repetition is necessary to impress an idea upon the mind, then this book should cause the words "traumatic occlusion" to become firmly associated in the minds of the readers with the condition commonly termed "pyorrhea." This association, however, has peculiar significance, for the statement is made, and no exception to it can be taken by the reviewer, that, "With the exception of traumatic occlusion the factors of periclasial etiology have been known and studied for years." Incidentally the lack of knowledge of the importance of this factor perhaps explains why the so-called prophylaxis treatment universally advocated has met with almost uniform failure in checking the progress of this disease. Apparently the attempts at treatment have been centered upon efforts to relieve the symptoms presented, rather than upon the alleviation of the causative factors. This fact in turn hinges upon the accuracy of the determination of the real cause or causes of the disease. To the authors of this book the dental profession is indebted for emphasizing the importance of the recognition of the factors of traumatic occlusion in this connection. For years the prime requisite in the treatment of this disease has been considered the scaling and polishing of the teeth and their roots. The deposits thus removed, we have reason now to believe, are the result of the existence of the disease and not the cause. A vicious circle may be maintained by permitting them to remain, but, as a factor in the original cause, they seem to have but little place. Salivary calculus is considered to have but a negligible part in the actual formation of pus pockets; serumnal calculus, while often found in the pockets, succeeds and never precedes the pocket formation. This fact may be clinically demonstrated by an observation of the relation of the islands of calculus to the attachment of the remaining peridental membrane; it will be found that they are an appreciable distance apart.

Some of the leaders in the dental profession will not grant to the exponents of the theory of traumatic occlusion the premise that it plays a major part in the cause of this disease. When differences arise it is well to attempt to find a common ground upon which agreement may be reached. The definition of traumatic occlusion given in the book—"An abnormal occlusal stress which is capable of producing or has produced an injury to the periodontium," seems to indicate that we may have reached the common ground, as all parties agree that an injury to the periodontium or gingival margin always pre-

cedes the formation of a pocket, or periclasia, as it is designated in the chapter on nomenclature.

It is not practical to attempt to give the methods of diagnosis or treatment outlined in the book, but one of the most significant statements deserves mention. It is found in the part on etiology, and is to the effect that an examination for the symptoms of traumatic occlusion should take precedence in diagnosis over all other factors, as neglect to recognize and correct traumatic occlusion will result in the failure to cure the patient notwithstanding other measures which may have been taken. It is contended that this condition when found must be eliminated and the teeth given a complete rest before convalescence can be expected.

That portion of the book devoted to treatment will undoubtedly receive more than its share of attention, and perusal thereof will indicate the broad aspect in which the problem has been dealt with by the authors. Under the heading "Detection and correction of traumatic occlusion," the use of carbon paper to locate the exact area for grinding to relieve undue occlusion is advocated. The use of this material, however, is open to certain objections, to overcome which Dr. F. A. Bricker has suggested the substitution of a mixture of perfumed vaseline and lampblack. His objection to the use of carbon paper are:

First. Its stiffness does not permit it to conform naturally to the surface of the teeth. The paper leaves its mark on any surface with which it comes in contact.

Second. Sufficient pressure for marking causes a slight displacement of traumatized teeth, and, therefore, the markings are misleading. This latter is also true of the wax method.

It is only after all corrections and restorations have been made that the final step, termed apoxesis, is undertaken. This term has been selected by the authors to designate the act of removing apoxemena from the periclasial pocket and rendering the denuded cementum smooth. This includes removal of the outer surface of the cementum so as to produce a surface of the greatest homogeneity. When it is recalled that the thickness of the cementum on the cervical and middle thirds of the tooth is about the thickness of a human hair the delicacy necessary to remove only the outer portion of this can be appreciated. The text does not extend hope of reattachment of periodontal fibers to cementum once denuded, and in this respect agrees with the findings of others who have made studies along this line. "Apoxesis is undertaken in order that a surface compatible with the overlying soft tissue may be obtained," is a statement which, when studied in connection with the fact that a pocket still remains which is lined with exposed connective tissue, makes it

apparent that to prevent reinfection of this susceptible tissue requires unremitting after care on the part of the patient.

The subject of diet in relation to periclasia is not overlooked, but "while undoubtedly important, is not at the present time sufficiently well understood to permit the formulation of definite theories." (H. E. H.)

AN OUTLINE OF THE MEDICAL SERVICE OF THE THEATER OF OPERATIONS, by M. A. W. Shockley, Lieutenant Colonel, Medical Corps, United States Army. P. Blakiston's Son & Co., Philadelphia, 1922.

This book contains the substance of lectures given at the General Service Schools, United States Army, during the sessions of 1919, 1920, and 1921, hence is up to date. It conforms to the organizational and tactical requirements of the new Army organization and the new medical service nomenclature.

The book contains 11 chapters in which the general organization and functions of the Medical Department of the Army, data relating to casualties, hospitalization and evacuation, the medical service of the camp and march, medical service in combat, in open operations and in trench operations, the service of collection, evacuation of casualties, and medical supply with cavalry commands, orders for the medical service, duties of the division surgeon and medical staff, duties of the surgeon and medical staff of an independent corps and army, and the medical department functions and duties of the chief surgeon of the theater of operations and communications zone are treated in sufficient detail to give one a good working knowledge of medical department activities at the front.

A great deal of information necessary to successful service with the United States Marine Corps in the field is contained in the volume which is especially recommended to all medical officers who have enrolled for the correspondence course for medical officers given by the Marine Corps Schools at Quantico, Va. (W. M. K.)

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

PREVENTIVE MEDICINE AND ITS RELATION TO MILITARY MEDICINE.¹

By R. F. JONES, Lieutenant Commander, Medical Corps, United States Navy.

The personnel as well as the material of an army or a navy must be maintained in the highest state of efficiency in time of peace as well as in time of war, if such organizations are to give a good account of themselves when an emergency arises. The material, other than that under the cognizance of the medical department, and the fighting qualities of the men are under the supervision of officers of other corps, but the medical corps is held largely responsible for the physical fitness of the personnel. Quite true, line and other staff officers must also shoulder this burden, and properly so, as it is impossible to maintain health in either civilian communities or military organizations unless everyone cooperates to the fullest extent.

The manufacture and the maintenance of the material things of war is quite simple when compared with the development and maintenance of the personnel of armies and navies. For instance, the battleship, which is composed of the most intricate machinery, some of which is as highly adjusted as a watch, may be built and made ready for war purposes within 2 years, whereas it takes from 18 to 20 years to develop the man before enlistment and from 6 months to a year after enlistment. A little attention each day to the most complicated machine in a battleship will keep this inanimate object in excellent condition; on the other hand, the human machine who uses the implements of war must receive constant attention throughout each day of life. This is usually done by the man himself, but experience has shown that if left to the man he will neglect his own mechanism. Therefore, we, as medical offi-

¹ Read before the Association of Military Surgeons, Oct. 12, 1922.

cers, must teach and train him how to give the proper attention to his body, the most delicate and intricate of all machinery. The medical officer has a much more responsible position than most of us assume; keeping men healthy, stalwart, and in the fullest physical vigor requires us to consider the individual person, groups of persons, and his or their environment; all of which lead us in devious pathways and byways of life, little understood by the greatest philosophers.

In so far as military medicine is concerned, the art and science of medicine should be considered as the study of health, how health is impaired, how to prevent impairment of health, and how to restore a diseased person to a healthy condition. In other words, the art and science of medicine is to us the practice of preventive medicine, diagnostics, and therapeutics; and preventive medicine should be practiced to a greater extent than any of the others, the others being considered as adjunct to preventive medicine.

In order to determine the importance of preventive medicine to military medicine, I submitted the following questions to a dozen or more prominent officers of the Navy, line and staff:

1. What percentage of the Medical Corps' energies should be devoted to preventive medicine?
2. What percentage to military duties?
3. What percentage to purely clinical medicine, including diagnostics and therapeutics?

The average of the answers to these questions was, approximately, 70 per cent to preventive medicine, 8 per cent to military duties, and 22 per cent to purely clinical medicine.

The relation of preventive medicine to military medicine may be more clearly understood by an analysis of the objects of military medicine, which, in my opinion, are as follows:

I. *To develop and fortify the physique of the individual, man and officer, and thus to increase the capacity and the powers of resistance of the individual and the command, thereby permitting the man and the command to withstand the hardships of war.*

It is not only necessary for a sailor or soldier to be normal in body and mind, but he must have sufficient strength and endurance to undergo, without breaking, the tremendous strains, both to mind and body, to which he is subjected in time of war or, for that matter, frequently in time of peace. All unnecessary losses of man power must be avoided, for it should be constantly held in mind that the loss of a single man weakens the turret team, a platoon, or any other unit of a navy or an army. Military men are agreed to-day that it is essential to reduce such losses to a minimum. The first step in preventing such unnecessary losses is to induct into service men who are physically and mentally sound.

Unquestionably the selection of recruits for an army or navy is one of the most potent preventive measures, in the hands of the medical officer, for the protection of the services against high morbidity and mortality rates which may occur from diseases and injuries other than casualties in action. The medical officer on recruiting duty must not only know health and pathological conditions affecting the human body, but he must have a knowledge of the military duties to which the men are to be subjected. For example, it is not necessary for a man who is to perform a yeoman's duty to have as good a physique as a fireman, but this yeoman must have the physical qualifications to perform other duties in an emergency without breaking at the time he is most needed.

Since the average civilian accepted at recruiting stations has not the physical development to withstand active military service, it is necessary that these men be sent to certain training centers in order to build up their physique before they are distributed among seasoned men. Furthermore, few men in civil life realize the importance of caring for their personal health or the health of their associates. At the training stations, we endeavor to teach the men personal hygiene, how to care for their clothing, etc. They are protected against small-pox and typhoid fever, and by building up their physique we attempt to protect them against other diseases, for it is well known that fatigue plays a large part in the susceptibility of the individual to disease.

The development and the maintenance of the physique of the man must not stop at the training station; it must continue throughout his service life. The line officer to-day realizes that physical training is as essential as training in arms. Consequently, a considerable portion of the time of a soldier or a sailor is spent in physical exercises; in fact, practically all duties, such as drilling, etc., take into consideration the physical development of the man. Another important measure in the hands of the medical officers looking toward the prevention of disease in the individual and the command is the constant surveillance of each man and officer in his unit. The medical officer must inspect them at regular intervals and must advise them in matters regarding their health. Farsighted commanders know how much depends on the feeding, clothing, and maintenance of the physique and morale of their men, and the vast majority will now take sensible recommendations from noncombatants, whereas a few years ago they would have paid little attention to it.

II. To prevent or remove the causes or conditions of disease or of its propagation; this not only to be done in military commands but in civilian communities where it may affect military operations.

To fulfill this obligation the medical officer must be the public-health officer of the command and therefore must know preventive

medicine and its associated sciences, which includes hygiene, sanitation, epidemiology, prevention and control of disease, diagnostic medicine, immunology, vital statistics, etc.; in fact, everything concerning man and his environment which will promote health and prevent disease.

Preventive medicine is too often interpreted to mean the prevention and control of communicable diseases. In its broader sense it deals with the prevention or the removal of the causes or conditions of any disease or of its propagation. The statistics of the Navy show that in the past five years 33.47 per cent of the admissions for all causes and 30.04 per cent of sick days were due to communicable diseases, such as measles, mumps, scarlet fever, meningitis, diphtheria, tuberculosis, etc. Of the remaining 66.53 per cent, 13.60 per cent were due to the venereal diseases, 8.19 per cent to injuries, and 44.74 per cent to all other causes. Tonsillitis and the various respiratory diseases, although not generally classed as communicable, caused practically as much damage as all other communicable diseases, exclusive of the venereal diseases. Medical officers treat these diseases lightly and make no concerted effort to prevent or control their spread. Chronic diseases which are insidious in their onset may possibly be controlled if detected in their incipency. This may be done by educating the personnel as to the cause and prevention of such conditions.

Although a great deal has been accomplished in the prevention and control of the so-called environmental diseases, much remains to be done in the prevention and control of diseases transmitted by contact infection. Medico-military specialists such as Ross, Reed, Gorgas, Lind, and many others, in their discoveries in the control of environmental diseases and food-deficiency diseases, stand out in history as great benefactors to the human race. Is it too much to expect medico-military men to again come forth with discoveries in the prevention and control of contact infections?

III. *To so function with the fighting forces that men are kept in their places in battle.*

One of the chief concerns of the commander of military forces in time of war is "to keep as many men at as many guns as many days as possible." Without organization this is impossible. Any organization must include all departments of the military forces, combatant and noncombatant, inasmuch as each is dependent upon the other. The medical department, in order to function properly with the various other departments of the military organization, must have its officers trained in the military profession as well as in medicine, for unless they have some understanding of tactics, strategy, etc., it will be impossible for them to carry out their function. The

medical department's activities, as well as the activities of all other departments, in time of war should be along lines which will promote the greatest efficiency of the Army or Navy. This can not be accomplished unless there is complete cooperation.

In what way may the Medical Corps best function with the remainder of the Army or Navy?

(a) By practicing preventive medicine throughout the military organization, never ceasing to use every practical means known to build up the physique of the men and prevent disease occurring among them.

(b) By making only such recommendations to the military commanders which will be of advantage in the movements of the troops; no recommendations which will interfere in any way with military tactics should ever be made.

(c) By raising the morale of troops, by promoting their health and comfort, and by giving them proper medical attention and treatment.

(d) By preventing shirkers or malingerers from leaving the line of battle and by sending all slightly injured back to duty immediately.

(e) By removing the injured or diseased from the fighting line as rapidly as possible and with the least interference with the combatant forces and the train of supplies; this should be done without calling on the combatant forces any more than is absolutely necessary.

IV. *To return diseased and injured men to duty as soon as practicable.*

Even during peace, should the Navy be fully manned, it would be necessary to employ approximately 3 per cent more men than are actually needed to man its ships and shore stations because of the fact that past experience has shown that an average of 3 men out of every 100 will be on the sick list each day during the year. In other words, the Navy is not only encumbered with a certain number of men but, which is of far greater importance, these are absent from their places in battle.

It is well known that man power will decide the fate of an army or navy, if all other things are equal. Therefore, the more active, healthy men in line of battle, and held in reserve for battle, the greater the opportunity for winning. Do medical officers always grasp this fact and do they always return men who are on the sick list to duty as soon as practicable? In studying over the hospital statistics of the Navy I have been impressed by the length of time that some men are kept on sick report in hospitals. The medical officer who retains men of the combatant forces in the hospital

longer than it is absolutely necessary is not cooperating to the fullest extent with the military commanders and is in a small way a detriment to the military forces rather than an assistance. Looking at it from another angle, the medical officer should realize that a man returned to his unit raises the morale of the troops to a tremendous extent, for the uninjured men then know that this man who fell in battle has been properly cared for.

V. To salvage men maimed as a result of service conditions and of the horrors of war.

The specialist in military medicine is not called upon in the salvaging of men maimed in war to the extent that he is in the practice of preventive medicine, for competent surgeons and other specialists may be easily inducted into service during war to care for such cases. However, it is necessary for medico-military men to know what should be done and how it should be done, for he will be in command of the hospitals or acting in the capacity of executive officer and must therefore have sufficient knowledge to know whether his assistants are competent to treat such cases or not. In time of peace it is necessary for the military establishments to have a certain number of specialists in surgery and other specialties in order to properly care for our own cases, for it is not always practicable or desirable at that time to obtain the assistance of the civilian specialist.

But, after all is said and done, all of our work in clinical medicine should be with the idea of restoring men to duty. Where it is found that a patient will not be restored to duty in a reasonable time, it is far more economical to discharge that man from the service and recruit another in his place. If this attitude is taken, it becomes clearly evident that the military services in time of peace need only a few highly trained clinical specialists. The services do need, however, medical officers thoroughly versed in the art and science of medicine, and each one of them should be specialized in military medicine.

In conclusion I wish to quote from an article by Sir William J. Polk in the *Chemical Age*, London, May, 1921, which shows in a few words what relation preventive medicine has to military organizations: "Every great soldier has realized that an army is limited in size by the difficulty of keeping it free from epidemics and communicable diseases; previously this factor pinned the army dimensions down to a unit of 100,000 men. When the resources of preventive medicine were properly applied the unit dimensions became 1,000,000 men. Preventive medicine made it possible to maintain 20,000,000 men under arms and abnormally free from disease (during the World War)."

HEALTH CONDITIONS OF THE NAVY.

There has been a slight improvement in health conditions of the Navy during the past month. The annual admission rate for all causes, entire Navy, for the four-week period ending December 9 was 550 per 1,000 per annum, as compared with the annual rate of 612 per 1,000 for the four-week period ending November 11. The admission rates for both diseases only and injuries were less than for the previous month.

Although the Navy has been fairly active in its recruiting campaign, fewer communicable diseases have occurred than might be expected under such circumstances. It will be noted in the table printed below that the admission rate for such diseases as measles and mumps, which occur so frequently among recruits, is far below the average.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of November, 1922, in comparison with the mean annual admission rates, month of November, for the four-year period 1918-1921, inclusive:

	Novem- ber, 1918- 1921.	Novem- ber, 1922.		Novem- ber, 1918- 1921.	Novem- ber, 1922.
Cerebrospinal fever....	0. 14	0	Mumps.....	17. 76	0. 27
Diphtheria.....	. 92	0. 27	Pneumonia.....	13. 48	1. 07
German measles.....	. 54	. 18	Scarlet fever.....	. 95	0
Influenza.....	98. 09	13. 03	Smallpox.....	. 02	0
Malaria.....	15. 23	9. 40	Tuberculosis.....	4. 15	2. 48
Measles.....	3. 79	. 18	Typhoid fever.....	. 11	. 09

By reference to the above table it will be noted that malaria was less prevalent during the month of November than the average for the previous four years. The annual admission rate of 1.07 per 1,000 for pneumonia for the month of November is far below the norm to be expected during that month.

The annual admission rate for venereal disease for the four-week period ended December 9 was 103 per 1,000 per annum, as compared with 167 per 1,000 per annum for the four-week period ended November 11. However, the morbidity rate for venereal disease for the period of the year which is already passed is approximately 120 per 1,000 per annum, which is only slightly under the rate for last year.

The mortality rate for all causes, entire Navy, for the month of November was 3.64 per 1,000 per annum, as compared with the mortality rate of 4.78 per 1,000 for the year 1921.

THE MODIFIED VON PIRQUET TEST OF ELLIS FOR TUBERCULOSIS.

This test has been used by Ellis in a large number of cases, and he considers it of great help both in the diagnosis and prognosis of pulmonary tuberculosis.

The original Von Pirquet test, according to Ellis, was unreliable in that the papillary layer of the skin was not penetrated. Von Pirquet states specifically that in performing this test blood should not be drawn. Ellis's investigations lead him to regard the papillary layer of the skin, in which the smaller blood vessels run, as the most keenly sensitive to tuberculous reaction. He considers that the specific reaction which takes place in the deeper epithelial layer explains to a large extent the erratic results obtained by Von Pirquet's superficial cutaneous method, as when the papillary layer was accidentally injured much more definite results would be obtained than when it was uninjured.

The method of procedure and performing the test of Ellis is as follows:

Three dilutions of old tuberculin are used, namely, 1:10, 1:100, and 1:500, the diluent in each case being one-half of 1 per cent carbolic acid in normal saline. The skin of the flexor surface of the fore arm is considered the best site for the test. A small drop of each dilution is placed on the fore arm, commencing just below the elbow, about an inch apart. Then, using a lancet with a round, very sharp point, a few quick movements are made through the drop and the superficial layer of the epidermis, about one-quarter of an inch long. The blood does not often appear until after the scarification at one point has been finished. The lancet is wiped, and the same procedure is carried out with another dilution at a lower spot. The three dilutions are used and the control, which is made without diluent, making four in all. The essential points are that the bleeding layer must be penetrated; the scratch must be made through the solution, and the knife must be wiped so that no solution is carried over to the next dilution and so vitiate the results. The lancet must be properly sharpened, and there must be at least five small scratches alongside each other at each dilution or the result is unreliable.

The whole is then covered with a small absorbent pad which is retained in position for two days by strips of adhesive plaster around the arm.

The procedure causes little inconvenience or discomfort, and the whole process takes less than two minutes, and there are no uncomfortable after effects. It is wise to tell the patients that the procedure is performed for the doctor's information, and will not cause any general reactions.

At the end of the second day the dressing is removed, and the reaction read. If the reaction is acute, the point of inoculation

will be red and swollen. The next characteristic will be the disappearance of the cut marks in contrast with the control. The swelling may be quite considerable, and is best appreciated by running the finger over the skin. The color varies in two directions. The brighter it is the more active and recent is the tuberculous infection. When the swelling is considerable, the color is driven out, and the skin resumes a lighter edematous appearance, suggesting a tendency to blister, and the bright color reaction invades the neighboring skin, extending to quite a considerable distance. When the swelling is slight or absent, the color of the reaction is much darker, and is often delayed in appearance, in which case it is advisable to see the patient again in three days before arriving at a definite conclusion. A darker reaction usually means an old infection. It may be so dark as to be nearly black, and that means that the case is old, quiescent, or one going to the bad with little or no resistance. The general condition of the patient will easily decide which of the two interpretations is to be recorded.

A positive reaction with the 1-100 dilution is one that is considered as showing presumptive evidence of active tuberculosis, when it is definitely of a color as bright as the lips, and when definite swelling has occurred.

A positive reaction with the 1-500 dilution generally means good resistance and more or less recent extension except when glands or skin tissues are involved, as these practically always give a positive reaction with this dilution. The darker colored reaction either means failing resistance, a very serious sign in a case possessing other evidence of tuberculous degeneration, or, where the case shows no signs of activity a condition of very satisfactory stabilization. This often shows itself by a positive reaction in the 1-10 dilution but with dark color, and with the 1-100 dilution showing no swelling and slight dark discoloration.

According to Ellis, a positive reaction with the 1-100 dilution is presumptive evidence of the existence of active tuberculosis in the ratio of 9 to 1, or, in other words, 90 per cent of all cases will show evidence of active tuberculosis.

In cases showing a negative or slight reaction, the evidence is against active tuberculous disease. One must be careful not to include a delayed color reaction as entirely negative, and cases showing delayed reactions should be further investigated.

REPORT OF AN OUTBREAK OF DIARRHEA ON THE U. S. S. "ARKANSAS."

Time and severity of outbreak.—From about 3 a. m., to 8 a. m., on October 11, 1922, 76 persons suffering with diarrhea and cramps were admitted to the sick list. These admissions were made in two

well-defined periods: 3 to 4 a. m., and 6 to 8 a. m. During the next 24 hours six additional cases were admitted and 60 of those previously admitted were discharged to duty. It is believed that several admitted were shirkers who desired to avoid duty as 16 admitted were sent to duty before noon on the 11th. On the other hand, it is proper to state that there were several affected who did not report at the sick bay, as one or two full bowel movements relieved them of all symptoms. It is estimated that about 150 men of the whole ship's company had diarrhea.

The symptoms in the great majority of cases were mild; slight cramps and one or two bowel movements and no vomiting. Twelve of the men admitted to the sick list suffered from prolonged purging, vomiting and cramps, and of these, six had to be given injections of morphia to relieve symptoms. There were four cases of collapse. Only 19 cases showed any rise in temperature—1 to 102, 2 to 101, 2 above 100, 3 to 100, 3 above 99, and 8 to 99. On the morning of the 12th all cases had normal temperature, with the exception of one who had a temperature of 99°F. Of the 6 persons admitted between 8 a. m., October 11, and 8 a. m., October 12, 2 had a temperature of 99 and 4 were normal.

Distribution of cases.—The outbreak was widespread effecting members of every division of the ship. The hospital division had the largest percentage of admissions. The following table shows the number of admissions by divisions:

First division.....	3	B division.....	10
Second division.....	4	E division.....	6
Third division.....	2	M division.....	8
Fourth division.....	3	N division.....	5
Fifth division.....	3	R division.....	1
Sixth division.....	1	S division.....	2
Seventh division.....	6	Hospital division.....	5
Eighth division.....	6	Nineteenth division.....	3
Ninth division.....	6		
Tenth division.....	3	Total.....	82
A division.....	6		

These divisions were messed in 40 separate messes each one of which had one or more members with diarrhea. The cause of the outbreak can not, therefore, be traced to any lack of cleanliness on the part of any messmen or any fault in the service of food at any one mess.

Epidemiological investigation of the outbreak.—The epidemiological investigation carried on by the senior medical officer covered the following points:

Scullery.—This compartment was clean, the mess gear was clean, and the daily sanitary report, dated October 11, 1922, for dinner and supper on the 10th and breakfast on the 11th showed the water in which the dishes were sterilized was of the following temperatures: Dinner, 100° C.; supper, 100° C.; breakfast, 99° C. From this it

can be seen that dirty and insanitary mess gear may be eliminated as the cause of the outbreak.

Water.—Water for drinking purposes was distilled on board. It was suggested that possibly boiler compound had contaminated the water. If true, it might account for the diarrhea and possibly for the cramps, but could not be assigned as a cause for the vomiting. However, two samples were sent to the U. S. S. *Relief* for analysis, and it was reported that the samples contained no chemical that could cause diarrhea. Drinking water can also be eliminated as a cause of the outbreak.

Food.—The following menus were served at the general mess on October 10, 1922:

<i>Breakfast.</i>	<i>Dinner.</i>	<i>Supper.</i>
Fried eggs.	Macaroni soup.	Beef stew.
Boiled peeled potatoes.	Roast veal, gravy.	Apple sauce.
Oatmeal, milk, sugar.	Bread dressing.	Pickled beets.
Dry toast.	Baked brown potatoes.	Bread, butter.
Bread, butter, coffee.	Creamed corn.	Tea, coffee.
	Pumpkin pie.	
	Bread, butter, coffee.	

The breakfast, it is believed, can be eliminated, without further consideration, as the cause of the outbreak.

Veal was taken out of cold storage twice on the 9th, at 5 a. m. and 4.30 p. m. Veal removed from cold storage at 5 a. m. was issued to the wardroom and junior officers' messes exclusively and was served to the wardroom mess for dinner on the 10th and for lunch and dinner to the junior officers on the same date. That broken out at 4.30 p. m. on the 9th was issued to the general mess and the chief petty officers' mess and was served to the general mess at the noon meal on the 10th and to the chief petty officers' mess at the noon meal on the 11th. There is no positive evidence that the veal served for dinner in the general mess on the 10th was a factor causing the diarrhea. Negative evidence, while of very slight value, tends to support this view. Veal broken out on the same day and part of that actually served in the general mess was eaten by members of four other messes and no diarrheal disturbances were reported from these messes. It would appear that the veal ingredient of the noon meal served in the general mess was not responsible for the diarrhea and it is highly improbable that any other item on the menu of this meal was responsible.

The beef stew served for supper on the 10th was composed of the following ingredients: Fresh beef, peas, potatoes, carrots, onions, and dumplings. The fresh beef was taken out of cold storage at 4.30 p. m. on the 9th and consisted of four forequarters. Thirty pounds of beef was issued to the junior officers' mess and 10 pounds to

the warrant officers' mess and the remainder was sent to the ship's galley where it was made into stew. That issued to the junior officers' mess was served for dinner on the 12th and that to the wardroom mess for dinner on the 11th. Some of the stew prepared for the general mess was served for supper in the chief petty officers' mess on the 10th. The peas used were canned. The potatoes, onions, and carrots were fresh. The dumplings were made on board from dough prepared in the bake shop. The apple sauce and beets were received on board less than two weeks before the outbreak. They were packed in 1-gallon tins. Three cases of each were examined by the executive officer and the senior medical officer and no swelled tops were found. The bread was made on board. Butter from the same source was served to all messes. Freshly made tea and coffee were also served at dinner. On inquiry of everyone on the sick list as to what portions of this meal he had eaten revealed the following:

	Yes.	No.		Yes.	No.
Beef stew.....	78	4	Beets.....	55	27
Apple sauce.....	80	2	Tea.....	63	17
Bread.....	79	3	Coffee.....	2	80
Butter.....	28	54			

Definite cause of outbreak undeterminable.—From the evidence obtained it is impossible to attribute the cause of the outbreak to any one article of diet. Considering the beef stew as a probable cause, it may be said safely that only the beef ingredients should be considered; however, four of the men who were sick ate none of it. Those portions of the beef issued to the junior officers' and wardroom messes caused no diarrhea. The chief petty officers' mess had some of the same stew for supper on the 11th and none developed diarrhea.

Two of the men who were ill did not eat apple sauce. The race-boat crew of 13 men ate apple sauce and no stew, and 3 of them had diarrhea. No apple sauce was served at the chief petty officers' mess. The beets, bread, tea, and coffee are above suspicion. Two cans of apple sauce were sent to the U. S. S. *Relief* for examination, but there were no facilities for making an examination.

It was recommended that the issue of apple sauce be discontinued for the present.

NOTES FROM THE U. S. S. "CLEVELAND."

The new prophylactic packages were tested thoroughly for the first time on the U. S. S. *Cleveland* at Key West, Fla. One hundred

tubes were used between October 22 and October 28, 1922. Only one case of gonococcus infection has resulted up to November 10. In this instance a tube was used immediately after exposure. Sufficient time has not elapsed to comment upon the effectiveness of this method of prophylaxis in so far as the other venereal diseases are concerned.

NOTES FROM THE U. S. S. "MARYLAND."

Three thousand two hundred prophylactic tubes were issued to 966 men of the crew of the U. S. S. *Maryland* during its stay at Rio de Janeiro from September 5 to September 12, 1922. It is presumed that these 966 men exposed themselves to venereal infection one or more times. There have been admitted to the sick list to date 39 cases with venereal infections traceable to exposure at Rio de Janeiro; and of these, 19 used tubes.

The following table shows the number of cases of gonorrhea, chancroid, and syphilis which followed the use of prophylactic tubes and the number of cases which occurred in men who stated that they had not used these tubes.

	Used tubes.	Did not use tubes.
Gonorrhea.....	11	10
Chancroid.....	7	9
Syphilis.....	1	1
	19	20

Of the 453 men who received prophylactic treatment on board ship only one developed a venereal diseases—gonorrhea. He stated that he had used a tube ashore. Most of the 453 men state that they had used tubes ashore, but wanted to be doubly protected.

It is presumed that other exposures occurred during the stay at Rio de Janeiro which were not recorded.

**ABSTRACTS FROM THE SANITARY REPORT OF THE U. S. S. "ALBANY,"
FOR THE PERIOD JANUARY, 1922, TO OCTOBER 10, 1922.**

The incidence of venereal disease was very high during the period covered by this report. The diseases were rampant in most of the ports visited, and at Chinwangtao, where this vessel had its longest stay, the absolute disruption of normal conditions incident to the civil warfare rendered satisfactory control difficult. Restriction from any particular area was useless, since the native population was

spread in all directions. The 80,000 inhabitants of the place were encamped in every conceivable manner about the countryside, the town itself being practically evacuated. The former houses of prostitution were closed and the inmates, as well as the larger part of the remaining female inhabitants, engaged in prostitution in a promiscuous manner. The general state of unrest and the resulting unfavorable conditions were naturally conducive to the spread of venereal infection.

From a general observation of conditions on the Asiatic station, the following truths in connection with the venereal situation in the Navy were brought out with unusual clarity:

1. That where the vessel remains for any considerable period of time in any port where conditions are normal a proper survey of the venereal situation with an eye to the restriction of certain area where venereal disease is discovered to exist, together with an adequate co-operation with the local authorities, may have a considerable effect on the incidence of venereal disease among the naval personnel.

2. That all placards, charts, lectures, etc., intended to instill a fear of venereal infection in the mind of the average enlisted man are practically fruitless. It is considered that educational measures, in the Navy at least, should be more particularly directed at the proper measures for prophylaxis.

A difference undoubtedly exists between the value of the various educational measures in civil life and in the Navy. The enlisted man realizes that he can be properly treated without expense to himself and without endangering his economic worth. In the large majority of cases he is willing to run the risk of venereal infection. Under the stimulus of new places and constantly changing surroundings, and in many cases befuddled with alcohol, he exposes himself with abandon. To the enlisted man a liberty is an event, especially when in new surroundings. To the civilian a "night in town" does not take on a holiday aspect. He can regulate his time and actions to a better advantage, and he is apt to be more impressed by the disaster of venereal infection, especially to his pocketbook. The psychology of the two is not entirely the same. The knowledge of the gravity of venereal infection to the individual's future, it would seem, has a greater weight in civilian life. In the Navy, speaking in terms of effect on venereal incidence, educational measures are secondary to procedures which have a thorough understanding of proper prophylaxis as an objective.

3. That the time limit, as has been very forcibly demonstrated of late, is the vital consideration in prophylaxis.

The new prophylactic tubes were not available during the recent cruise, and the immediate prophylaxis in the proper form was not possible. Compound calomel ointment was prepared in bulk and

was available to all liberty parties. Further prophylaxis was also instituted upon return to the ship. But because of the necessarily inadequate means of injecting the ointment into the urethra as well as the lack of an attractive handy package (which would tend to enhance the value of same and increase the confidence of the individual in its merits) the prophylaxis as practiced on the recent cruise was not considered satisfactory.

It is considered that the new tube will prove a boon. It is further considered that a small cake of suitable soap incorporated in the prophylactic package would be a valuable adjunct. This is especially true in the Orient, where soap is decidedly less frequently encountered than elsewhere and where chancroidal infections are very common.

ABSTRACTS FROM THE SANITARY REPORT, U. S. S. "OLYMPIA," FOR THE PERIOD JANUARY 1 TO DECEMBER 9, 1922.

There were 42 cases of venereal disease admitted to the sick list from January 1 to December 9, 1922, giving a rate of 111 per 1,000 per annum. While this is below the average rate for the Navy as a whole, it is entirely too high as compared with the infrequency of other communicable diseases aboard ship. More infections were acquired in Philadelphia than in any other port. Clandestine prostitution is said to be very prevalent in Philadelphia, although open houses of prostitution are not permitted. It seems that a considerable number of the crew make more or less lasting alliances with immoral women in ports where the ship remains for a prolonged period. Such men soon become careless about medical prophylaxis or neglect it altogether. Several of the infections occurring in Philadelphia were acquired in this way. Posters, pamphlets, verbal warnings, and other forms of propaganda seem to have but little effect in reducing this type of exposure, as the men boast of their adventures with considerable pride and look upon the possibility of infection as merely a part of the risk which they gladly take. It is thought, however, that educational measures have reduced somewhat the number of exposures in foreign ports where the ship remained for a short time. Men who only occasionally expose themselves are believed to be much more careful about prophylaxis than they might otherwise be as a result of such propaganda.

The prophylactic packets are considered much the better method of administering medical prophylactic treatment, as no publicity is attached to their use. It is believed that the infrequent offender, who is usually averse to taking the other form of treatment in the crew's head, where he is publicly exposed to other men, and then signing his name in the treatment book, has availed himself of the

packets. Moreover, they can be used promptly in almost any situation without great inconvenience and therefore should actually be more frequently employed within the short period when venereal disease may be prevented.

The idea that prophylactic packets would tend to increase exposure is incorrect. The men who had habitually used the injection form of treatment often continued to do so, and some took an injection upon returning to the ship even though they had used one of the packets immediately after exposure. The fact that no record is made of treatment is believed to be negligible, as several men were suspected of putting their names on the treatment book after disease had developed, a form of deception which may be difficult to prove. Moreover, only one record of treatment may be present when repeated exposures have occurred.

NEWLY ENLISTED AND REENLISTED MEN ARRIVING AT RECEIVING SHIPS AND STATIONS NOT TO BE HELD FOR TYPHOID INOCULATION.

The following extracts are quoted from a letter of the Bureau of Navigation dated November 15, 1922:

"In the future, newly enlisted and reenlisted men arriving at receiving ships and stations shall not be held for typhoid inoculation provided they can be immediately transferred to a ship or station to which a medical officer is regularly assigned. If there is to be a delay of a few days prior to further transfer, the first of the series of inoculations can be administered and the remaining inoculations given on board the ship or station to which transferred. In all cases complete record shall accompany the man.

"Commanding officers of receiving ships and stations will exercise careful supervision in order that the application of these instructions do not prevent the inoculation of all men newly enlisted and reenlisted, and that in transferring them after receiving their first inoculation they may arrive at their destination in ample time to continue the treatment."

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.

GHR VH 132679(101).

Serial No. 222-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 19 October, 1922.

To: All medical and dental officers.

Subject: Supply table. Increase in allowance of towels and operating gowns for use in dental offices.

1. An increase of six operating gowns and eighty-four towels has been added to the allowance on pages 46 and 47 of the supply table for the use of dental officers, and the naval medical supply depot has been instructed to honor requisitions for twelve gowns and one hundred twenty towels.

E. R. STITT.

Circular letter.

Serial No. 223-1922.

GHR VH 124842(104)

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 23 October, 1922.

To: All naval dental officers, via official channels.

Subject: Dental Form K reports.

1. It has been noted that dental officers have been recording temporary fillings of cement and gutta percha in the spaces below the record for permanent fillings on Form K Dental.

2. As no record is kept at this bureau of fillings of a temporary nature, it is requested that the practice of recording them on Form K Dental be discontinued.

E. R. STITT.

Circular letter.

Serial No. 224-1922.

AWD-VH-125884 (104)

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 24 October, 1922.

From: Chief of the Bureau of Medicine and Surgery.

To: All naval hospitals (continental limits).

Subject: Foodstuff expended during the fiscal year 1922.

1. It is directed that each hospital submit to the bureau an itemized total of all foodstuff expended during the last fiscal year. These totals to be compiled from the twelve monthly totals of the commissary ledger. This statement to show the *quantity* of each item, cost not to be considered or reported.

2. Also give the total number of subsistence days for the fiscal year 1922.

E. R. STITT.

WWB EGM P 13 42022.

Circular letter.

Serial No. 225-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 24, 1922.

To: All medical officers.

Subject: Hospital Corps situation.

1. The Hospital Corps situation is acute and rapidly becoming more so. A shortage of 720 men exists to-day, and the bureau is faced with an additional loss, by expiration of enlistment alone, of 469 prior to 1 January, 1923. The percentage of reenlistments is small, and it is necessary that all officers put forth special efforts to persuade desirable trained men to reenlist, to extend their enlistment, and to be examined for advancement in rating.

24205-23-11

2. The following table shows the excess and shortage in ratings other than chief pharmacist's mates:

Rating.	Shortage.	Excess.
Ph. M. 1c.....	342	.....
Ph. M. 2c.....	362	.....
Ph. M. 3c.....	382	.....
H. A. 1c.....		177
H. A. 2c.....		116

There are excellent prospects for the advancement of candidates for the above petty officer ratings shortly after their names are placed on the eligible list in the Bureau of Navigation, and all men who meet the requirements of Bureau of Navigation circular letter 12-22 of 28 March, 1922, and, in the opinion of the medical officer with whom they are serving, are qualified for and deserving of advancement, should be encouraged and urged to take the examinations as prescribed in articles D-4332, 4383 (1) (2) and (3) Bureau of Navigation Manual.

3. The Bureau of Medicine and Surgery will give consideration to requests made for change of duty contingent upon extension of enlistment or reenlistment, and if possible will recommend favorable action. Men desiring duty in the Tropics or on the Asiatic station (including Guam and Samoa) must have at least 1½ or 2 years to serve, respectively, after leaving the United States to be eligible for such duty.

4. The Bureau of Medicine and Surgery believes that additional effort and cooperation on the part of all officers relative to reenlistment or extension of enlistment and examination for advancement will improve the morale of the Hospital Corps and measurably lessen the difficulties facing the Bureau. It should be remembered that it is impossible to fill all ratings in complements when shortages exist as at present.

E. R. STITT.

WSG:ESK 132687-O(94).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 15 November, 1922.

To: All naval hospitals.

Subject: Menus, etc., for Thanksgiving and Christmas dinners.

References: (a) This Bureau's letter to Supplies and Accounts 132687(94), 11/4/22.

(b) Supplies and Accounts 1st endorsement 402-24-J/182-5, 11/8/22.

(c) Navigation's 2nd endorsement 772-649, 11/11/22.

1. The expenses for the procurement of menus for the general mess at naval hospitals may be defrayed from funds allotted to naval hospitals from the appropriation "Recreation for enlisted men."

2. The present allotments will be expected to cover this expense, which it is understood has been in some instances heretofore defrayed from outside sources.

E. R. STITT.

WSG:ESK 132687-O.

16 NOVEMBER, 1922.

To: All naval hospitals.**Subject: Envelopes and general schedule of supplies.****Enclosures: (a) "Award of contracts for envelopes," 1923.****(b) "General schedule of supplies," 1923.**

1. The above-mentioned publications are being forwarded by separate enclosure.

2. In preparing requisitions for envelopes and other supplies, listed, item numbers, subnumbers, and letters, designating the exact supplies should be used, and reference should always be made to "Award of contracts for envelopes, 1923" or to "General schedule of supplies, 1923," as the case may be.

E. R. STITT.

WHCA/v 12 9733(112)

Circular letter.

Serial No. 226-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., November 11, 1922.

To: All naval hospitals (within continental limits of the United States).**Subject: Index of Veterans' Bureau publications, etc.****Enclosure: (1) Index referred to in subject of this letter.**

1. The accompanying enclosure is a cross index of Veterans' Bureau publications, including general orders, field orders, regulations, etc.; also of Medicine and Surgery circular letters pertaining to Veterans' Bureau activities.

2. This index is complete to date and is forwarded with a view of facilitating necessary references to Veterans' Bureau publications, etc.

3. You are requested to check up this index with the Veterans' Bureau publications and Medicine and Surgery circular letters pertaining to Veterans' Bureau activities on file at the hospital under your command and to notify this bureau of missing publications. All missing publications will be forwarded upon receipt of request indicating which ones are required.

4. You are requested to cross-index, in accordance with the accompanying enclosure, all future publications pertaining to Veterans' Bureau activities which may be received.

5. This index was compiled from information obtained from the central office, U. S. Veterans' Bureau, and does not include the local district Veterans' Bureau regulations.

E. R. STITT.

INDEX.

A.

Absent without official leave:

1. Patients absent for a period of twenty-four hours or longer shall be subject to the following disciplinary action upon return to the hospital:

(a) Withholding of pass privileges.

(b) Confinement to grounds of the hospital.

(c) Withholding special privileges.

(d) Or such other reasonable and customary methods of punishment as may be in force in that particular institution.

(e) Repeated absence without leave may properly result in referring the case to a board of officers, who may recommend forfeitures or discharge or both. (See Veterans' Bureau G. O. No. 27-A.)

Absent without official leave—Continued.

2. When a patient is absent for twenty-four hours the district manager shall be promptly notified. (See Veterans' Bureau G. O. No. 27-A.)

3. A patient absent for seven days shall be reported to the director and district manager as having been discharged. Report to be made on Form No. 1873. (See Veterans' Bureau G. O. No. 27-A.)

Admission of all classes of cases from the Veterans' Bureau. (See Bureau M. & S. circular letter 97-1921.)

Admission of patients:

1. Two copies of report cards (in-patient), Form 1971-F, will be executed upon admission in addition to copy retained at the hospital. One of the copies to be forwarded to the manager of the district and one direct to the Veterans' Bureau. See Bureau M. & S. circular letter 190-1922.)

2. Cards will be forwarded in a manila envelope obtained from the Veterans' Bureau by requisition. Two cards as noted above. All envelopes, which should always bear the name of the forwarding station, will be numbered consecutively, beginning at one, and will be marked thus, "Cards 1971-F Package No. —." All envelopes will be addressed to:

The Director.

Attention Medical Statistics Section,

U. S. Veterans' Bureau, Washington, D. C.

(See Vet. Bu. Hosp. section circular No. 2; Bureau M. & S. circular letter 190-1922.)

3. No patient discharged from a hospital for disciplinary reasons will be admitted to a hospital until a period of three months has elapsed since discharge. (See Veterans' Bureau G. O. No. 27-A.)

4. For second offense, a period of six months shall elapse before the patient will be readmitted. (See Veterans' Bureau G. O. No. 27-A.)

5. A patient may be rehospitalized after being "Discharged against medical advice" by the district manager in which the hospital is located. If he appears outside of that district, permission must be obtained from the Director. (See Veterans' Bureau G. O. No. 27-A.)

6. Every patient of the U. S. Veterans' Bureau should receive a register number upon admission to the hospital. This number should be retained by the patient until discharged, and it should appear on all records of the patient during the period in hospital, particularly admission and disposition cards. The register number of U. S. V. B. patients should be assigned consecutively from one district series for each hospital. Only one number will be assigned to each patient during one continuous hospitalization. A new register should be assigned upon readmission of a patient. The numbers should be carried on indefinitely. (See Bureau M. & S. circular letter 190-1922.)

Application of person disabled in and discharged from service:

This form will be used when application for compensation, insurance benefit, or vocational training is requested; Form No. 526. (See Veterans' Bureau G. O. No. 5.)

B.

Bed capacity for Veterans' Bureau cases. (See Bureau M. & S. circular letters 193-8-203-1922.)

Burial in national cemetery. (See "Funeral expense.") :

Unclaimed bodies of Veterans' Bureau patients shall be buried in national cemeteries. (See Veterans' Bureau G. O. Nos. 67 & 127.)

C.

Certificates of illness:

Certificates of illness may be furnished Veterans' Bureau cases. (See Bureau M. & S. circular letter 174-1922.)

Charges for disciplinary board. (See "Disciplinary boards"; see Veterans' Bureau G. O. No. 27-A.)

Compensation:

Request for will be submitted on Veterans' Bureau Form No. 526. (See Veterans' Bureau G. O. No. 5.)

Contact representative:

Appointment of a contact representative in hospitals caring for 100 or more Veterans' Bureau patients. (See Veterans' Bureau G. O. 132.)

Convening orders for disciplinary boards. (See "Disciplinary boards.")

Cooperating:

Officers of the Veterans' Bureau in their official capacity will be permitted access at all hospitals where beneficiaries of the Veterans' Bureau are being treated. With a view (a) to acquaint the hospital authorities with the general aim and policies of the bureau; (b) to ascertain character of professional treatment; (c) to cooperate with commanding officer in the investigation of complaints made to the bureau. (See Veterans' Bureau G. O. No. 23.)

D.

Daily report of patient turn-over:

Veterans' Bureau G. O. No. 90 may be construed to mean that a daily report may be necessary from hospitals in order that the daily report of the district office be complete. (See Veterans' Bureau G. O. No. 90.)

Dead: (See "Transportation, dead"; "Funeral expenses"; "Burial in National cemeteries"; War Risk Regulations No. 33.)

When a Veterans' Bureau patient dies in a hospital three (3) copies of Form N shall be prepared and forwarded to the district. (See Bureau M. & S. circular letter No. 73-1921.)

Telegram to be sent to next of kin. Form to be used. (See Bureau M. & S. circular letter No. 73-1921.)

Dental work:

1. Dental claims and fee table for treatment by designated dental examiners. (See Veterans' Bureau Regulations Nos. 17, 17-A, & 17-B.)
2. Dental examinations and treatment. (See Veterans' Bureau G. O. Nos. 45 & 45-A.)
3. Claimants of the Veterans' Bureau in naval hospitals shall receive dental care as naval patients. (See Bureau M. & S. circular letter 122-1921.)

Discharge of patients:

1. Two copies of report cards, Form No. 1971-F will be executed upon discharge in addition to copy retained at the hospital. One of the copies to be forwarded to the manager of the district and one direct to the Veterans' Bureau. Cards will be forwarded as directed under "Admission of patient." (See Bureau M. & S. circular letter 190-1922.)
2. Transportation of patients discharged from hospitals. (See "Transportation of patients.")
3. Discharge of dissatisfied hospitalized patients. (See "Dissatisfied patients.")

Discharge of patients—Continued.

4. Notice of discharge of patient for disciplinary reasons shall contain a statement as to need of further hospitalization. (See Veterans' Bureau Field Order No. 19.)
5. Forward Veterans' Bureau Form No. 2545 in triplicate.
6. Upon discharge from the hospital the patient shall be examined by the hospital authorities and a report submitted in duplicate to the district manager. (See Veterans' Bureau G. O. No. 26.)
7. If a patient is ready for discharge from a hospital, and object to such discharge, the commanding officer shall appoint a board to examine the man. A written report in duplicate shall be submitted, and when approved by the commanding officer, forwarded with appropriate comments to the assistant director of the Medical Division. (See Veterans' Bureau G. O. No. 26.)
8. When a claimant is to be discharged from a hospital, further treatment being unnecessary, it shall be determined if he is eligible for training. If such be the case he shall not be discharged from the hospital until after all arrangements have been made for such training, if desired by the claimant. (See Veterans' Bureau G. O. No. 26-A.)
9. If a patient completes his treatment after being rehospitalized for "Discharge against medical advice," he shall receive transportation to his home. (See Veterans' Bureau G. O. No. 27-B.)
10. Patients discharged as noted in the preceding reference shall be the subject of a special report to the district manager and the Medical Division of the Veterans' Bureau, calling attention to the fact that this discharge comes within the provisions of G. O. 27-A, Section IV, par. 4. (See Veterans' Bureau G. O. No. 27-A.)
11. If a patient completes his treatment after being rehospitalized for "discharge, disciplinary," he will be given transportation to his home, and such discharge will be the subject of a report as outlined in the above reference 9. (See Veterans' Bureau G. O. No. 27-A.)

Discharge of patient "absent without leave":

1. A patient absent for a period of seven days will be dropped from the rolls of the hospital and reported on Form No. 1873 to the district manager and director. (See Veterans' Bureau G. O. No. 27-A.)
2. An insane patient removed from the hospital by his family or guardian without authority from the commanding officer will be handled as in cases of "patient leaving without official leave." (See Veterans' Bureau G. O. No. 27-A.)

Discharge of patients "against medical advice":

1. Patients discharged against medical advice for the first time will be given transportation to their homes or as outlined in B. W. R. F. O. No. 20, see "transportation of patients." (See Veterans' Bureau G. O. No. 27-A.)
2. Patient leaving hospital against medical advice will not be given transportation or expenses to another hospital. (See Veterans' Bureau G. O. No. 27-A.)
3. Should a patient on his second hospitalization again be discharged against medical advice, he will not be entitled to transportation or other expenses on discharge. (See Veterans' Bureau G. O. No. 27-A.)
4. When a patient is discharged against medical advice, the same shall be reported on V. B. Form No. 1873. (See Veterans' Bureau G. O. No. 27-A.)

Discharge of patients "against medical advice"—Continued.

5. When a patient is discharged against medical advice, a board of medical officers shall investigate the same, and report in duplicate will be prepared and not until approved by the commanding officer shall the man be discharged. (See Veterans' Bureau G. O. No. 27-A.)

Disciplinary boards:

1. Charges, specifications, convening orders, and form of procedure dealing with actions under Veterans' Bureau General Order No. 27-A. (See Veterans' Bureau G. O. No. 32.)
2. Board will be governed by the customary procedure of Government boards. Shall consist of two medical officers of the staff and one member appointed by the district manager. (See Veterans' Bureau G. O. No. 27-A.)

Disciplinary discharge:

1. Notice of such discharge shall contain a statement as to need of further hospitalization. (See Veterans' Bureau Field Order No. 19.)
2. Disciplinary discharges should not be carried into effect when such procedure would work injury to the patient. Rather than discharge such cases it is suggested that the disciplinary board take advantage of G. O. No. 27-A, which provides for a fine of a part of the claimant's compensation. (See V. B. Hospital Section Circular No. 53.)
3. A man discharged for disciplinary reasons shall not be admitted again until three months has elapsed since discharge. (See Veterans' Bureau G. O. No. 27-A.)
4. For second offense, a period of six months shall elapse. (See Veterans' Bureau G. O. No. 27-A.)
5. A patient discharged for disciplinary reasons will be given transportation to his home or place from which hospitalized. See "Transportation of patients." (See Veterans' Bureau G. O. No. 27-A.)
6. Patients will not be discharged for disciplinary reasons when the following conditions exist:
 - (a) No patient who is mentally irresponsible shall be discharged for disciplinary reasons.
 - (b) No patient shall be discharged for disciplinary reasons if his physical condition is such as to endanger his life by reason of such discharge.
 - (c) No patient will be discharged for disciplinary reasons except on the recommendation of a board of officers, approved by the commanding officer.(See Veterans' Bureau G. O. No. 27-A.)
7. Upon the second or subsequent discharge of AWOL or for disciplinary reasons, the Board of Officers may recommend forfeiture of compensation up to a maximum of 75 per cent each month for a period of three months. (See Veterans' Bureau G. O. No. 27-A.)
8. If recommendations as outlined above have been approved by the commanding officer, he shall inform the man that he has a right to appeal and will do so within three days in writing to the commanding officer, who will forward the appeal to the district manager of the district. (See Veterans' Bureau G. O. No. 27-A.)
9. Whenever a patient is discharged for disciplinary reasons, or disciplined by forfeiture of compensation, Form No. 1874 shall be prepared in triplicate. One copy retained, one sent to the manager of the district, and one to the Hospital Section, Medical Division, Veterans' Bureau. In each instance a copy of the board proceedings will accompany Form 1874. (See Veterans' Bureau G. O. 27-A & 27-B.)

Disciplinary regulations. See Veterans' Bureau G. O. No. 27-A; "Absent without official leave"; "Disciplinary Boards"; "Disciplinary discharge"; "Discharge of patient, against medical advice"; "Discharge of patient, absent without official leave"; "Discharge of patients."

Dissatisfied patient:

1. If a patient leaves the hospital against the advice of the medical officer, the district office and the bureau in Washington shall be notified. Record of same shall be recorded in the hospital record. Patient shall be informed that he will not be given transportation to return to the hospital. If dissatisfaction is due to treatment and it is believed that some other hospital may be able to handle the case to the benefit of the patient, the medical officer shall request the district officer to transfer the man. If transfer is not recommended by the medical officer, he shall so state. (See Veterans' Bureau Field Order No. 7.)

District offices:

Fourteen district offices established and designating the territory each covers. (See Veterans' Bureau G. O. No. 3.)

Domiciliary cases:

Shall be transferred to a soldiers' home. (See Bureau M. & S. circular letter 167-1922.)

E.

Error in claim for compensation:

May be reopened when evidence of error is submitted. (See War Risk G. O. No. 84.)

F.

Forms of procedure for disciplinary boards. (See "Disciplinary Boards.")

Funeral expenses:

1. The sum of \$100.00 shall be available for the funeral expenses; also cost of an attendant to accompany remains and the cost of transportation. (See War Risk Regulations No. 58.)
2. Destitute patients or trainees may be buried in a national cemetery, provided:
 - (a) Expenses as outlined above are not exceeded.
 - (b) Such burial is desired by next of kin.
 - (c) Permission from proper authority has been obtained.
 - (d) If inmate of service or contract hospital at time of death.

Bill shall be submitted under two heads, viz: Funeral expense and transportation and incidental expense. (See Veterans' Bureau Regulations No. 58.)

3. Funeral expenses for veterans of the Spanish-American War, Philippine insurrection, and Boxer rebellion will not be paid by the Veterans' Bureau, but he may be buried in a national cemetery if authority is granted; otherwise the body will be disposed of by the local health authorities if not claimed by the next of kin. (See Veterans' Bureau Regulations No. 30.)

Forfeiture of compensation:

1. Upon the second or subsequent discharge for AWOL or for disciplinary reasons, the board of officers may recommend forfeiture of compensation up to a maximum of 75 per cent each month for a period of three months. (See Veterans' Bureau G. O. No. 27-A.)

Forfeiture of compensation—Continued.

2. If recommendations as outlined above have been approved by the commanding officer, he shall inform the man that he has a right to appeal, and will do so within three days, in writing, to the commanding officer, who will forward the appeal to the district manager of the district. (See Veterans' Bureau G. O. No. 27-A.)
3. When a patient has been discharged for disciplinary reasons and the board has recommended forfeiture of compensation, the hospital shall submit a report of physical examination and report of the findings of the board of officers. Both reports shall be forwarded in duplicate. Submit Form Nos. 1873 and 1874. (See Veterans' Bureau G. O. No. 27-A.)
4. If patient does not appeal, report of action taken shall be submitted on Form No. 1874 and sent to the district manager. (See Veterans' Bureau G. O. No. 27-A.)
5. In the cases of patients who have committed an offense, and where it is not deemed necessary to recommend their discharge, a board of officers may recommend a forfeiture of compensation up to a maximum of 75 per cent each month for a period of three months. The following will be performed in connection with the above: Submit Form No. 1874; (a) inform patient of right to appeal and that he shall submit written report within three days; (b) inform district manager by telegram of the approved recommendation of the board; (c) copy of telegram to be mailed to the central office. (See Veterans' Bureau G. O. No. 27-A.)
6. When an appeal is made, a certain form shall be signed by the patient involved. (See M. & S. circular letter 170-1922.)

H.**Hospital admission card Form No. 1971-D:**

Card shall bear the following notation: "Not valid after ten days from date of issuance." (See Veterans' Bureau Field Order No. 36.)

I.**In-patient report card No. 1971-F:**

Shall be forwarded in duplicate as outlined under "Admission of patient" and "Discharge of patient." (See Bureau M. & S. circular letter No. 190-1922.)

Insane:

An insane person removed from the hospital by his family or guardian without the authority of the commanding officer will be handled as "Absent without official leave." (See Veterans' Bureau G. O. No. 27-A.)

Inspections:

Instructions for district medical inspectors. (See Veterans' Bureau Field Order No. 29; Veterans' Bureau G. O. Nos. 39 and 39A.)

M.**Monthly report to Veterans' Bureau:**

1. A monthly report shall be forwarded to the Veterans' Bureau setting forth the number of transactions in Veterans' Bureau cases; form to be used. (See Bureau M. & S. circular letter 206-1922.)

Monthly report to Veterans' Bureau—Continued.

2. A monthly report of occupational therapy activities shall be forwarded. One copy shall be forwarded direct to the Bureau of Medicine and Surgery. (See Bureau M. & S. letter 129733(104), of October 24, 1922.)

O.**Oaths:**

Authority of officers of the Army and Navy to administer oaths concerning Veterans' Bureau patients. (War Risk Bulletin No. 84.)

Occupational therapy:

1. Views of the Veterans' Bureau as regards the use and successful application of this mode of treatment. (See hospital section circular Nos. 30 and 30-A.)
2. Naval Hospital will furnish their own equipment and personnel for the application of this treatment. (See Veterans' Bureau G. O. No. 68-A.)
3. Occupational therapy includes any occupation, mental or physical, that will hasten recovery from disease or injury. It includes the old term "prevocational training." (See Veterans' Bureau G. O. No. 68-A.)
4. A monthly report of occupational therapy activities shall be forwarded. One copy shall be forwarded direct to the Bureau of Medicine and Surgery. (See Bureau M. & S. letter 129733(104), of October 24, 1922.)
5. Policy of the Bureau of M. & S. as regards the handling of this work. (See Bureau M. & S. circular letter 189-1922.)
6. All articles made by V. B. patients from material supplied by the Bureau of Medicine and Surgery will be held pending legislation regarding their disposal. (See Bureau M. & S. circular letter 201-1922.)

P.

Patients, transfer of, to other hospitals. (See "Transfer of patients to other hospitals.")

Physiotherapy:

1. Equipment for its application will be furnished by the Navy. Personnel for its application will also be furnished. (See Veterans' Bureau G. O. No. 68-A.)

Prosthetic appliances:

1. Rules relative to the furnishing of prosthetic appliances, repairs, and renewals of the same to claimants of the Veterans' Bureau. (See Veterans' Bureau Regulations Nos. 7, 7-A & 7-B.)

R.**Refusing treatment:**

1. Action to be taken. (See Bureau M. & S. circular letter 166-1922.)

Relation of the Veterans' Bureau to Navy and contract hospitals. (See Veterans' Bureau Field Order No. 43.)

Requisitions for supplies:

1. Procedure in requisitioning supplies, equipment, and blank forms. (See Veterans' Bureau Field Order No. 43.)

Reopening of cases:

1. Cases may be reopened when error in the original has been discovered. (See War Risk G. O. No. 84.)

S.

Sale of by products of authorized activities of vocational training. (See Veterans' Bureau Regulations No. 29.)

Specifications for disciplinary boards. (See "Disciplinary boards.")

Standard of requirements for hospitals. (See Veterans' Bureau G. O. No. 28.)

T.

Total disability:

1. Rules for determining the same. (See Veterans' Bureau Regulations Nos. 4 & 4-A.)

Trainees:

1. Trainees who take sick while under training will be given hospital treatment. (See Bureau M. & S. circular letter 160—1922.)

Transfer of patients to other hospitals:

1. Medical officers in charge of hospitals will recommend a climatic change for patients only when a sufficient medical reason exists for such transfer. All recommendations for transfer will be forwarded on Medical Form No. 1899. (See Veterans' Bureau hospital section circular No. 8.)

Transportation of dead:

1. Remains will be sent to the former home of the deceased upon request of the next of kin, and expense will be paid by the Veterans' Bureau. (See War Risk Regulations No. 33.)
2. When remains of a Veterans' Bureau patient is transported by Government bill of lading, the following notation shall appear thereon: "Transportation under this bill of lading are payable by the U. S. Veterans' Bureau, Washington, D. C., in accordance with Bureau of War Risk Insurance letter dated October 16, 1920. (See Bureau M. & S. circular letter 154—1921.)

Transportation of patients:

1. When a discharged patient requests transportation to a place other than that from which transportation was furnished when the patient was originally admitted to the hospital, such shall be his bona fide residence and if necessary the claim that his address has been changed should be supported by affidavits from two disinterested parties. (See War Risk Field Order No. 20.)
2. Patients discharged against medical advice for the first time will be given transportation to their homes. (See Veterans' Bureau G. O. No. 27-A.)
3. Claimants and beneficiaries are entitled to the following: (a) Report to a medical officer for an authorized medical examination; (b) transfer to a service or contract hospital; (c) report back to their homes when treatment or observation is complete. Exceptions: Cases coming under V. B. G. O. No. 27-A. (See Veterans' Bureau Regulations Nos. 16 & 16-A.)
4. Veterans' Bureau will not pay for transportation of veterans of the Spanish-American War, etc. (See Veterans' Bureau G. O. No. 30.)
5. Patients leaving a hospital against medical advice will not be given transportation to another hospital. (See Veterans' Bureau G. O. No. 27-A.)
6. A patient who has completed his treatment after being rehospitalized for discharge against medical advice shall be given transportation to his home. (See Veterans' Bureau G. O. No. 27-A.)

Transportation of patients—Continued.

7. Should a patient on his second hospitalization again be discharged against medical advice, he will not be entitled to transportation on discharge. (See Veterans' Bureau G. O. No. 27-A.)
8. A patient who has been discharged for disciplinary reasons will be given transportation to his home or place from which hospitalized. (See Veterans' Bureau G. O. No. 27-A.)
9. A patient who has been discharged for disciplinary reasons will not be given transportation back to the hospital if rehospitalization has been authorized. (See Veterans' Bureau G. O. No. 27-A.)
10. A patient discharged upon completion of treatment after being rehospitalized from disciplinary discharge will be given transportation to his home. (See Veterans' Bureau G. O. No. 27-A.)
11. A patient discharged for AWOL, who was rehospitalized after disciplinary discharge, will not be entitled to transportation to or from a hospital afterwards. (See Veterans' Bureau G. O. No. 27-A.)
12. Transportation to homes of Veterans' Bureau patients will be furnished even when mileage is furnished by the Navy. (See Bureau M. & S. circular letter 146—1921.)

V.

Veterans of Spanish-American War, Philippine Insurrection, and Boxer Rebellion:

1. May be treated by hospitals under the Veterans' Bureau. (See Veterans' Bureau Regulations No. 30; "Funeral expenses.")
- Vocational schools. (See Veterans' Bureau G. O. No. 78, 78-A, 78-B, & 78-C.)
- Vocational training:

1. Request for shall be submitted on Form No. 526. (See Veterans' Bureau G. O. No. 5.)
2. Sale of by-products. (See Veterans' Bureau Regulations No. 29.)

W.

Weekly report of Veterans' Bureau patients:

1. Shall be sent by telegram and contain certain information. (See Veterans' Bureau M. & S. circular letter 156—1921.)
2. Working details for Veterans' Bureau patients. (See Bureau M. & S. circular letter 100—1921.)

Circular letter.

WJCA: ESK 129733(113).

Serial No. 227—1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 15 November, 1922.

To: All naval hospitals within the continental limits of the United States.

Subject: Instructions regarding U. S. Veterans' Bureau physio-therapy Forms 1603, 2581, and 1606.

Enclosures: (a) Instruction sheet.

(b) U. S. V. B. Medical Division Form 1603.

1. You are directed to comply with the instructions contained in the accompanying enclosures.

2. It is understood that the physio-therapy forms referred to will be forwarded by the U. S. Veterans' Bureau direct to naval hospitals.

3. In compiling U. S. V. B. Medical Division Form 1603, in column 1, under "Names and dates of duty of aides and assistants," you are directed to make a statement to the effect that physio-therapy work in naval hospitals is conducted by members of the Medical Corps, Nurse Corps, and Hospital Corps, and in the following columns to give only the total number of treatments: Such as: Massage, 10; electro-therapy, 15; hydro-therapy, 25; thermo-therapy, 10; exercise, 20; total, 80; average daily treatments, 7, etc.)

4. In naval hospitals where physio-therapy aides are employed Form 1603 will be filled out as indicated, together with the statement referred to in paragraph 3.

5. Information called for on the forms referred to above applies only to beneficiaries of the U. S. Veterans' Bureau, and no information concerning physio-therapy administered to naval or patients other than beneficiaries of the Veterans' Bureau will be included in these reports.

E. R. STITT.

Circular letter.

Serial No. 228-1922.

WJCA:ESK 129733(104).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 27 November, 1922.

To: All naval hospitals within the continental limits of the United States.

Subject: Monthly reports of occupational therapy from U. S. naval hospitals caring for Veterans' Bureau cases.

References: (a) Bureau of Medicine and Surgery letter WJCA:ESK 129733 (104) of 24 October, 1922.

(b) Circular letter, serial number 186-1922, of 16 May, 1922.

(c) Circular letter, serial number 196-1922, of 29 June, 1922, WJCA:ESK 129733(64).

Enclosures: (1) U. S. Veterans' Bureau report of occupational therapy activities.

1. Reference (a), addressed to commanding officers of several of the naval hospitals, is hereby canceled and future reference to the subject of this letter should refer to this circular letter.

2. References (b) and (c) and any other instructions regarding the forwarding of reports about occupational therapy to the U. S. Veterans' Bureau or to this bureau are hereby canceled.

3. You are directed to comply with instructions as outlined in the accompanying enclosure, and to modify them in such a manner that an additional copy of this monthly report marked "Copy for the Bureau of Medicine and Surgery" is to be forwarded directly to this bureau.

4. It will be seen that to compile these reports it will be necessary to obtain certain information from the Red Cross occupational aids and from the educational aids employed by the Bureau of Medicine and Surgery.

5. This report refers only to beneficiaries of the U. S. Veterans' Bureau. Similar reports on naval personnel are not required.

E. R. STITT.

Circular letter.

Serial No. 229-1922.

WJCA: ESK 129733 (113).

**DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 28 November, 1922.**

To: All naval hospitals within the continental limits of the United States.

Subject: Instructions regarding reports of physio-therapy and occupational therapy treatments to beneficiaries of the United States Veterans' Bureau.

References: (a) Letter from Director, U. S. Veterans' Bureau BWC/s/10, P. & O. T. hospital subdivision of November 20, 1922.

(b) Bureau of Medicine and Surgery circular letter serial No. 227-1922, WJCA: ESK 129733(113), of November 15, 1922.

(c) Bureau of Medicine and Surgery circular letter WJCA: ESK 129733(104), of November 27, 1922, serial No. 228-1922.

1. The contents of reference (a) is quoted herewith for your information:

"Referring to forms for monthly reports of physio-therapy and occupational therapy treatments given to beneficiaries of this bureau, you are advised that it is found necessary, because of certain changes in the administration of the work, to make definite modifications in the forms from those which were approved by a board of representatives from the various services, which met last spring.

"In respect to Form Med. 1870-Rev., it is suggested that the information called for in columns 1, 2, 3, 4, 5, 6, and 7, need not be included in reports from your hospitals, so far as the Veterans' Bureau is concerned. There is, however, no objection to these columns being filled in if the information is desired by your office. The date, name, and address of the station, with the "Summary," will be all that will be required on this form by the bureau for statistical purposes.

"On Form 1603 the 'Names and days of duty of aids and assistants,' with the 'Number of treatments,' given by each, may be omitted; also the use of Forms 2614-M, 2614-D, 2581, 2592, and 1606 is optional with you. That is, all the reports desired by the Veterans' Bureau is a summary of the number of Veterans' Bureau patients in each hospital, with the number of those taking physio-therapy and occupational therapy, and the number of treatments or occupied hours."

2. The Bureau of Medicine and Surgery does not require the information called for in columns 1, 2, 3, 4, 5, 6, and 7, Form Med. 1870-Rev., referred to in paragraph 2 of reference (a).

3. Attention is invited to the last sentence of paragraph 3 of reference (a).

4. You are directed to forward directly to the U. S. Veterans' Bureau the original forms called for in reference (a), and to forward to this bureau carbon copy of these forms marked "For the Bureau of Medicine and Surgery."

E. R. STITT.

Circular letter.

Serial No. 230-1922.

WJCA: ESK 129733(121).

**DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 5 December, 1922.**

To: All naval hospitals within the continental limits of the United States.

Subject: U. S. Veterans' Bureau publication Med. 1644 (schema for the classification of patients on examination).

References: (a) Bureau of Medicine and Surgery letter WJCA: ESK 129733 (113) of 23 November, 1922.

(b) Letter from Director, U. S. Veterans' Bureau of November 20, 1922.

Enclosures: (1) Copy of schema mentioned in subject.

1. Reference (a), addressed to commanding officers of several of the naval hospitals, is hereby cancelled, and future reference to the subject of this letter should refer to this circular letter.

2. The Director of the U. S. Veterans' Bureau has requested that the accompanying schema for the classification of patients on examination be used for all beneficiaries of the Veterans' Bureau under treatment for pulmonary tuberculosis in naval hospitals.

3. This bureau has requested the U. S. Veterans' Bureau to forward to the commanding officers of the various Naval Hospitals a sufficient number of these schemata that each medical officer in hospitals caring for Veterans' Bureau patients may be furnished with one copy.

E. R. STITT.

Circular letter.

Serial No. 231-1922.

WSD/JBC 124677-O.

DEPARTMENT OF THE NAVY.

BUREAU OF MEDICINE AND SURGERY.

Washington, D. C., December 7, 1922.

To: All naval hospitals in the United States, sick quarters, marine barracks, Quantico.

Subject: Use of Navy standard caskets for shipment or local burial.

1. The naval medical supply depot, Brooklyn, N. Y., has on hand a large surplus of Navy standard caskets purchased during the World War. It is desirable for reasons of economy, and because of the considerable storage space occupied, that these caskets shall be used by the hospitals instead of caskets purchased from contracting undertakers under annual requisitions for care of the dead.

2. It is therefore directed that naval hospitals shall, until further notice, make use only of the item under requisition for preparation for shipment which provides for furnishing of casket by the Government, the intention being that the Navy standard casket shall be used in every case.

3. It is noted that at a number of the hospitals the requisition for local burial of the dead makes no provision for the furnishing of a casket by the hospital. It is presumed that a unit bid was accepted, providing for all necessary services, including casket furnished by the undertaker, in which case, probably, it will be impossible for these hospitals to utilize Navy caskets for local burials during the life of the present contracts. At the Navy hospitals, Portsmouth, N. H., Annapolis, Md., Puget Sound, Wash., Mare Island, Calif., and San Diego, Calif., however, Navy standard caskets will be issued to the undertaker for encasement of bodies prepared for local burial.

4. Immediate requisition will be made on the naval medical supply depot, Brooklyn, N. Y., or Mare Island, Calif., for a sufficient stock of caskets to comply with the above directions, and subsequent requisitions will be made, from time to time, so that the number carried shall be always sufficient to meet the usual requirements of the hospital and render the purchase of caskets from contracting undertakers unnecessary.

5. The Navy standard casket will be used for deceased Veterans' Bureau patients and for retired enlisted men of the Marine Corps. (M. & S. circular letter, serial No. 221-1922, No. 124677-O, October 12, 1922.)

6. In special cases, where death occurs distant from the hospital, as in case of aviators or at civilian hospitals, etc., and where the terms of the contract do not apply, the expenses for the care of the dead will be covered by appropriate "special" requisitions in each such case, prepared after all expenses in the particular case have been ascertained. Navy standard caskets will be issued for these cases if practicable.

7. These instructions shall not be construed to prevent the purchase of a casket in an emergency when it is impracticable to procure a Navy standard casket.

8. For the fiscal year 1924 the bureau will furnish a form or detailed instructions for preparation of requisitions for care of the dead. The hospitals will withhold their annual requisitions for care of the dead until these instructions are received.

E. R. STITT.

Circular letter.
Serial No. 232-1922.

WEE: SS 124680(122).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 8, 1922.

To: All medical officers.

Subject: Syphilitic abstract sheet in health record.

1. Until a new supply is available for distribution, it is desired that syphilitic abstract sheets shall be made out in the case of all personnel in which a diagnosis of syphilis is made and attached to the health record.

2. At present the abstract sheet bears the notation "(Enlisted men only)". This notation hereafter will no longer apply.

E. R. STITT.

31847-43
N65-JPL-BL

NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., 11 October, 1922.

BUREAU MANUAL CIRCULAR NO. 13.

From: Bureau of Navigation.

To: All ships and stations.

Subject: Medical discharges.

1. The following changes in Bureau of Navigation Manual are approved and directed to be made upon receipt of this letter:

ART. D-8030. Strike out and substitute the following:

ART. D-8030(a). In the cases of newly enlisted men who have been examined and passed at recruiting stations, this examination will be considered final, and they are not to be rejected upon examination after arrival at the training stations.

(b) In all cases of manifest unfitness, such men will be sent to a hospital for observation prior to medical survey.

(c) Great caution is to be observed in regard to defects and diseases that can be easily simulated.

(d) No enlisted man shall be discharged from the service on account of medical survey without the approval of the Bureau of Navigation.

(e) Any defects or disabilities noted upon examination at the training station will be entered in the man's health record.

R. H. LEIGH, Acting.

24205-23-12

VITAL STATISTICS.

The "Monthly Health Index," which is published on the 15th of each month, contains the statistical data for individual ships and shore stations. The statistics appearing in this Bulletin are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{3.65}{28}$ or $\frac{3.65}{38}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE NO. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the month of November, 1922.*

	Entire Navy.	Forces afloat.	Forces ashore.	Marine Corps.
Complement.....	117,298	73,369	43,929	21,478
All causes:				
Number of admissions.....	5,418	2,638	2,780	1,278
Annual rate per 1,000.....	480.38	431.44	618.58	618.83
Disease only:				
Number of admissions.....	4,748	2,302	2,446	1,129
Annual rate per 1,000.....	420.97	376.49	544.26	541.84
Injuries and poisons:				
Number of admissions.....	670	336	334	149
Annual rate per 1,000.....	59.40	54.95	74.32	76.99
Communicable diseases exclusive of venereal disease:				
Number of admissions.....	569	242	327	175
Annual rate per 1,000.....	50.04	39.58	72.76	84.73
Venereal disease:				
Number of admissions.....	1,177	810	367	241
Annual rate per 1,000.....	104.36	132.48	81.66	116.70

TABLE NO. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of November, 1922.*

	Forces afloat navy and marines (complement), 73,369.		Forces ashore navy and marines (complement), 43,929.		Total (complement), 117,298.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases.....	2,302	376.49	2,446	544.26	4,748	420.97
Injuries and poisons.....	336	54.95	334	74.32	670	59.40
Total admissions.....	2,638	431.44	2,780	618.58	5,418	480.38
Class III:						
Appendicitis, acute.....	47	7.69	31	6.90	78	6.92
Autointoxication, intestinal.....	6	.98	10	2.23	16	1.42
Cholangitis, acute.....	15	2.45	11	2.45	26	2.31
Cholecystitis, acute.....	2	.33	1	.22	3	.27
Colitis, acute.....	2	.33	0	.....	2	.18
Constipation.....	14	2.29	24	5.34	38	3.37
Enteritis, acute.....	22	3.60	11	2.45	33	2.93
Gastritis, acute, catarrhal.....	6	.98	10	2.23	16	1.42
Gastroenteritis.....	28	4.58	67	14.91	95	8.42
Hemorrhoids.....	17	2.78	18	4.01	35	3.10
Pharyngitis, acute.....	13	2.13	8	1.78	21	1.86
Ulcer of duodenum.....	5	.82	2	.45	7	.62
Ulcer of rectum.....	0	.....	1	.22	1	.09
Ulcer of stomach.....	0	.....	3	.67	3	.27
Total admissions.....	177	28.95	197	43.83	374	33.16
Class VII:						
Varicocele.....	9	1.47	18	4.01	27	2.39

TABLE NO. 2.—*Number of admissions reported by Form F cards, etc.—Con.*

	Forces afloat navy and marines (complement), 73,366.		Forces ashore navy and marines (complement), 43,929.		Total (complement), 117,295.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class VIII:						
Chicken pox.....	3	.49	3	.67	6	.53
Diphtheria.....	0	.....	3	.67	3	.27
German measles.....	1	.16	1	.22	2	.18
Influenza.....	90	14.72	57	12.68	147	13.08
Measles.....	1	.16	1	.22	2	.18
Mumps.....	1	.16	2	.45	3	.27
Pneumonia, broncho.....	2	.33	7	1.56	9	.80
Pneumonia, lobar.....	9	1.47	6	1.34	15	1.33
Total admissions.....	107	17.50	80	17.80	187	16.58
Class IX:						
Dysentery, bacillary.....	0	.....	1	.22	1	.09
Dysentery, entamebic.....	1	.16	1	.22	2	.18
Typhoid fever.....	0	.....	1	.22	1	.09
Total admissions.....	1	.16	3	.66	4	.35
Class X:						
Dengue.....	106	17.24	138	30.71	244	21.63
Malaria.....	17	2.78	89	19.80	106	9.40
Total admissions.....	123	20.12	227	50.51	350	31.03
Class XI:						
Tuberculosis (all forms).....	11	1.08	17	3.78	28	2.48
Class XII:						
Chancroid.....	206	33.69	75	16.69	281	24.91
Gonococcus infection.....	530	86.68	225	50.06	755	66.94
Syphilis.....	74	12.10	67	14.91	141	12.50
Total admissions.....	810	132.48	367	81.66	1,177	104.36
Class XVIII:						
Bronchitis, acute.....	134	21.92	164	36.49	298	26.42
Laryngitis, acute.....	3	.49	2	.45	5	.44
Pleurisy, acute fibrinous.....	5	.82	9	2.00	14	1.24
Rhinitis, acute.....	14	2.29	15	3.34	29	2.57
Tonsillitis, acute follicular.....	171	27.97	153	34.04	324	28.73
Total admissions.....	327	53.48	343	76.32	670	59.40
Class XX:						
Herniae.....	25	4.09	36	8.01	61	5.41

TABLE NO. 3.—*Summary of annual admission rates for venereal disease reported from ships for October and from various shore stations for the five-week period, October 31 to December 2, 1922, inclusive.*

	Annual rate per 1,000 October, 1922.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	13.64	168.89	2,315.80	19.78	192.55	1,500.00
Battleship and cruiser force:						
Atlantic Fleet.....	29.60	150.21	524.22	53.54	161.64	416.23
Pacific Fleet.....	79.85	140.11	802.97	66.87	161.08	647.84
Asiatic Fleet.....	61.85	87.17	109.59	46.73	366.37	560.13
Destroyer force:						
Atlantic Fleet.....	0	120.25	700.00	27.71	179.14	800.00
Pacific Fleet.....	0	90.71	409.45	35.29	11.42	247.42
Asiatic Fleet.....	0	524.74	2,315.80	171.43	543.07	1,341.18
Miscellaneous force:						
Atlantic Fleet.....	0	142.10	1,010.00	19.78	150.98	226.31
Pacific Fleet.....	0	116.24	484.30	29.05	132.69	688.07
Asiatic Fleet.....	0	634.52	876.49	91.24	585.36	1,500.00

TABLE NO. 3.—*Summary of annual admission rates for venereal disease reported from ships for October and from various shore stations for the five-week period, October 31 to December 2, 1922, inclusive—Continued.*

	Annual rate per 1,000, Oct. 31 to Dec. 2, 1922.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States.....	0	84.17	240.00	0	90.92	245.79
First naval district.....	0	68.02	110.14	35.05	60.95	185.08
Third naval district.....	25.04	90.27	212.54	9.50	109.31	187.50
Fourth naval district.....	78.78	292.52	100.50	24.69	260.25	219.07
Fifth naval district.....	0	81.61	142.78	50.75	84.86	245.79
Sixth naval district.....	0	63.44	67.20	39.96	49.90	137.16
Seventh naval district.....	0	0	0	0	0	0
Eighth naval district.....	115.07	119.13	138.66	112.00	129.67	125.12
Ninth naval district.....	94.66	94.66	94.66	114.66	114.66	114.66
Eleventh naval district.....	10.83	11.21	15.82	10.00	26.40	70.88
Twelfth naval district.....	74.55	133.37	167.09	67.23	120.82	151.04
Thirteenth naval district.....	0	77.04	240.00	0	45.04	190.62

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent October, 1922.		Per cent since July 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships.....	63.53	9.15	65.03	7.13
Battleship and cruiser force:				
Atlantic Fleet.....	53.21	18.35	66.60	8.44
Pacific Fleet.....	70.91	3.03	72.31	6.02
Asiatic Fleet.....	66.66	33.33	47.76	19.40
Destroyer force:				
Atlantic Fleet.....	74.63	4.48	75.52	5.21
Pacific Fleet.....	92.31	5.13	85.60	6.99
Asiatic Fleet.....	51.31	7.89	49.00	4.50
Miscellaneous:				
Atlantic Fleet.....	63.53	9.41	62.66	8.89
Pacific Fleet.....	70.91	21.82	71.98	10.99
Asiatic Fleet.....	55.88	7.35	51.59	4.76

	Per cent Oct. 31 to Dec. 2, 1922.		Per cent since July 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States.....	76.15	16.31	75.29	11.79
First naval district.....	92.85	7.15	78.12	9.37
Third naval district.....	91.30	0	77.04	12.29
Fourth naval district.....	73.33	13.33	85.92	5.52
Fifth naval district.....	67.94	25.64	68.44	15.65
Sixth naval district.....	68.75	6.25	68.51	5.55
Seventh naval district.....	0	0	0	0
Eighth naval district.....	50.00	30.00	70.58	9.81
Ninth naval district.....	100.00	0	97.05	0
Eleventh naval district.....	0	0	85.71	7.14
Twelfth naval district.....	79.62	20.38	73.42	15.94
Thirteenth naval district.....	100.00	0	86.66	6.66

TABLE NO. 4.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the five-week period, October 31 to December 2, 1922, inclusive.*

Classes.	Navy (complement), 95,820.		Marine Corps (complement), 21,478.		Total (complement), 117,298.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood.....	5	0.54	7	3.39	5	0.44
Diseases of circulatory system.....	50	5.43	137	66.34	57	5.05
Diseases of digestive system.....	569	61.76	1	.48	706	62.60
Diseases of ductless glands and spleen.....	6	.65	18	8.72	7	.62
Diseases of ear.....	86	9.33	16	7.75	104	9.22
Diseases of eye and adnexa.....	81	8.79	38	18.40	97	8.60
Diseases of genito-urinary system (non-venereal).....	174	18.89	27	13.07	212	18.80
Communicable diseases transmissible by oral and nasal discharges.....	250	27.13	1	.48	277	24.56
Communicable diseases transmissible by intestinal discharges.....	4	.43	143	69.24	5	.44
Communicable diseases transmissible by insects and other arthropods.....	238	25.83	4	1.94	381	33.78
Tuberculosis (all forms).....	24	2.60	241	116.70	28	2.48
Venereal diseases.....	1,128	122.43	64	30.99	1,369	121.38
Other diseases of infective type.....	254	27.57	22	10.65	318	28.19
Diseases of lymphatic system.....	47	5.10	9	4.36	69	6.12
Diseases of mind.....	37	4.02	23	11.14	46	4.08
Diseases of motor system.....	94	10.20	13	6.29	117	10.37
Diseases of nervous system.....	67	7.27	208	100.72	80	7.09
Diseases of respiratory system.....	891	96.71	43	20.82	1,099	97.44
Diseases of skin, hair, and nails.....	92	9.99	12	5.81	135	11.97
Hernia.....	56	6.08	35	16.95	68	6.03
Miscellaneous diseases and conditions.....	118	12.81	54	26.15	153	13.57
Parasites (fungi and certain animal parasites).....	187	20.30	3	1.45	241	21.37
Tumors.....	19	2.06	148	71.66	22	1.95
Injuries.....	546	64.69	11	5.33	744	65.97
Poisons.....	34	3.69			45	3.99
Total.....	5,107	554.29	1,278	618.83	6,385	566.11

TABLE NO. 5.—*Deaths reported, entire Navy, for the five-week period, October 31 to December 2, 1922, inclusive.*

Causes.	Navy (complement), 95,820.	Marine Corps (complement), 21,478.	Total (complement), 117,298.
Pneumonia broncho.....	1	0	1
Tuberculosis, chronic pulmonary.....	2	0	2
Syphilis.....	1	0	1
Typhoid fever.....	2	0	2
Other diseases.....	13	2	15
Drowning.....	6	2	8
Other accidents and injuries.....	11	1	12
Total.....	36	5	41
Annual rate per 1,000, all causes.....	3.91	2.42	3.64
Annual death rate per 1,000, disease only.....	2.06	.97	1.86

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VOL. XVIII

NO. 2

UNITED STATES NAVAL MEDICAL BULLETIN

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INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

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COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
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PREFACE.

The UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, editorial comment on current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,
Surgeon General United States Navy.

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NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form, such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear:

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XVIII.

FEBRUARY, 1923.

NO. 2.

SPECIAL ARTICLES.

THE MILITARY SURGEON AS A SPECIALIST.^{1,2}

By D. N. Carpenter, Captain, Medical Corps, United States Navy.

In these days of intensive specialization it is to be expected that medical officers of the Army and Navy should seek to obtain greater proficiency in chosen branches of their profession. How far this specialization should go is open to discussion.

The Medical Departments of the Army and Navy recognize the need of further instruction of graduates from civilian medical schools before they can satisfactorily perform their duties as military surgeons. The difference in requirements of duty is reflected in the curricula of the Army and Naval Medical Schools. Brig. Gen. Walter D. McCaw, commandant of the Army Medical School, Washington, D. C., states in a letter of July 17, 1922:

"Under our present scheme of instruction all students, both medical and dental, first take a four months' course at Carlisle and afterwards come to the Army Medical School and the Army Dental School here in Washington. During the session just closed there were 50 medical officers and 14 dental officers who had passed Carlisle undergoing instructions here in Washington.

"As to specialization, we teach certain specialties, as you may see, in the school for two reasons: First, because in certain things, such as diseases of the eye, ear, nose, and throat, roentgenology, and in laboratory work all medical officers are supposed to have a certain amount of training; second, from the classes we very readily pick out certain men who show unusual promise in some particular specialty, and these men are usually selected to go to the general hospitals or the Army laboratories to continue their work."

¹ Paper read before the Association of Military Surgeons of the United States, Washington, D. C., October 12, 1922.

² Reprinted from *The Military Surgeon*.

In the Medico Military Review of May 15, 1921, the course at Carlisle is outlined as follows:

"At the Medical Field Service School, Carlisle Barracks, Pa., instruction pertains essentially to the development of the military part of an officer's education, special emphasis being given to tactical (field) training.

"At present the maximum accommodations provide for 90 student officers at one time. Facilities for expansion exist, and in the future the capacity will be increased as funds for this purpose become available.

"As this is a tactical school, and the Medical Department consists of officers of the Medical, Dental, Veterinary, and Medical Administrative Corps, courses are arranged for the combined training of all these officers. On the contrary, it is contemplated that only medical officers will be given technical medical training at the Army Medical School, although until other facilities are provided for them the veterinary and dental officers will be considered eligible for laboratory and other courses to be conducted at that school. Eventually the Medical Department will maintain a technical school for each of its major services, such as an Army dental school, an Army veterinary school, and an Army nurse school, in addition to the Army Medical School.

"The long or standard basic course is primarily conducted to meet the needs of all candidates for admission to the Medical, Dental, and Veterinary Corps of the Regular Army. The instruction is progressive and extends from the school of the soldier to the organization, functions, and administration of Medical Department units attached to the field forces or in home territory, in peace or in war, such as regimental detachments, medical regiments, evacuation hospitals, surgical hospitals, hospital trains, general hospitals, station hospitals, etc. The course is also designed to prepare the inexperienced officer for the discharge of his military duties upon entering the service, irrespective of whether his assignment be with mobile or fixed formations. The course constitutes his induction into military life and is a prerequisite to admission to the professional (technical) school of his special corps. When the needs of the Regular Army have been met the remaining accommodations each year will be made available for medical officers of the National Guard or Reserve Corps who can spare the time to take this full course.

"At the Army Medical School, Washington, D. C., instruction pertains essentially to the development of the professional part of an officer's education, special emphasis being paid to technical (medical) training.

"At present the maximum accommodations provide for 75 student officers at one time.

"The standard basic course in technical subjects is primarily conducted for medical officers of the Regular Army who have entered the service as commissioned officers since the beginning of the preceding course and who have satisfactorily completed the basic course at the Medical Field Service School at Carlisle Barracks, Pa., and for selected officers of the National Guard and Reserve Corps. It has as its object postgraduate study of the following subjects in their application to military conditions: Bacteriology, parasitology, and preventive medicine; sanitary chemistry, nutritional chemistry, clinical and operative surgery, clinical medicine, ophthalmology, and roentgenology. (All clinical work is given at Walter Reed General Hospital, Takoma Park, D. C.)

"The special advanced (postgraduate) courses are maintained for selected medical officers who desire to undertake postgraduate work, or make an intensive study of any professional specialty, including any of those subjects mentioned above. Students for the advanced courses will be selected for their special fitness for the particular subject or subjects they are to pursue. As these courses will be highly specialized, and as they will require a student's full time, each officer will, as a rule, be detailed to take but one of them during a given session."

The Naval Medical School, Washington, D. C., runs two classes a year of four and a half months duration each. Capt. C. S. Butler, Medical Corps, United States Navy, in command, states in a letter of 19 July, 1922:

"It has been found during the 20 years of the school's existence that this length of course serves the bureau's purpose best and holds the student's attention with a minimum of lag. We have a laboratory capacity of 30 students. It is not practicable, however, for the bureau to order this number to each course. We had 27 in the fall class (1921), and 14 in last spring's class.

"As to the needs of recent graduates, the course as shown in the roster meets these needs fairly well. It is the Surgeon General's wish that the course be made as sensitive to anything that is new and of value as possible, and we try to discard any item of instruction which does not pay its way. The Surgeon General has also instituted the policy of giving the recent entrants the course here, and the older men who have seen service any postgraduate work at civilian institutions which their service performance or peculiar bent may merit. This is making for better satisfaction and, in my opinion, is a constructive way of educating service medical officers.

"We are establishing a school for dental officers and aviation surgeons, and will have these in operation in conjunction with

this school by 1 January, 1923. The special courses are also given to hospital corpsmen and to female nurses at various places.

"We are making plans to increase the instruction in gas warfare and cardio-vascular diseases (including electrocardiography) and to give the class instruction in physiotherapy. A medical officer is now taking special work in this subject with a view to acting as the bureau's adviser and school instructor in it."

After graduation from the Government medical school the young doctor has become, to a certain extent, a specialist—a military surgeon. With considerable proficiency in his profession from experience as interne in a civilian hospital, the young officer's career is about to begin. Those of us who have spent years in the service realize the value of experience from varied duties. Not only must the military surgeon keep abreast of the times in medical subjects, but the advancement of methods of modern warfare and military organization demand constant attention. The naval medical officer must understand the details of ship sanitation, and he should be informed as to methods of field sanitation, in case of service with landing parties or duty with the marines. The development of the submarine, airplane, and gas warfare has presented new problems which naval medical officers must solve.

It will require several years of application and experience before the Army surgeon can handle the problems presented in the evacuation of wounded over complicated terrain. Modern methods of warfare have obliged Army medical officers to extend their knowledge of poisonous gases, aviation, and handling of field casualties. In both services the professional duties of medical officer of the day at hospitals and stations are much alike, though the military duty may be different because of the organization. Knowledge of clerical work and the preparation of necessary forms are important. Only experience by varied duties will train a medical officer to handle many problems which arise.

As for the purely professional requirements, the rapid advances in all branches of medicine and surgery require constant study. Then there are special subjects which a military surgeon must keep in touch with, such as tropical diseases, sanitation, and military surgery. The requirements of duty may demand a considerable knowledge of obstetrics and pediatrics, after years of inability to use such previous training. Or else the military surgeon may be at an isolated post or on a ship where no eye and ear specialist is available, and he must rely on his own skill and knowledge. He may be situated where opportunity is given to study new diseases, and knowledge of laboratory methods will prove invaluable. Ability to operate is always a requirement of a military surgeon.

It would appear, then, from this brief outline that to be an able and well-qualified military surgeon requires one's best efforts of study and considerable experience and training. Are we perhaps wrong in trying to make him a "jack-of-all-trades and master of none"? Are the advantages of concentration on any one subject, as is done by civilian specialists, worth while to the military surgeon?

Brigadier General McCaw states:

"We know it to be highly necessary to have a certain number of qualified specialists in the service, and so far we have succeeded in producing such in numbers sufficient for our needs."

Captain Butler of the Naval Medical School says:

"As regards specialization, the Medical Corps *must* have officers whose opinions are sound in many different specialties, e. g., X ray, cardiovascular diseases or surgery, laboratory (chemical, serological, pathological) hygiene and sanitation. Broadly, these specialties set themselves off into those of internal medicine, surgery, and sanitation. Now, it is not incompatible with the ability to do the general work of the naval medical officer if he specializes in internal medicine, or if he is the best operating surgeon in the Navy, or if his conception of the problems of hygiene is the best obtainable. In fact, if he knows his special work thoroughly and practically, he must know a good deal of medicine, surgery, and sanitation in general. It is in this sense that the Navy must have specialists, but as for having these committed to a specialty in the more restricted sense of the civil practitioner, I do *not* think it is desirable."

What are the advantages and disadvantages of intensive specialization for the military surgeon? The value of having men highly skilled in a specialty is clearly seen in civilian life, and it would appear logical to assume the same would be true for the Government service. When we remember, however, the demands of duty for the military surgeon, requiring courses in various specialties after entry into the service, it is apparent that civilian and military practice are not entirely comparable. Every civilian community of any size maintains its specialists to whom cases can be referred. The medical officer is, however, frequently alone on a ship which may not be near a hospital ship or port where a specialist is available. Or he may be stationed at a small isolated post or detachment. To insure a reasonable degree of skilled care at all times for the officers and men of the Army and Navy, it is necessary to have a large majority of the Medical Corps trained to meet any emergency.

During recent years there has been a tendency for higher specialization, especially among the younger men, before they have attained proficiency as military surgeons. Concentrating on their specialty, they do not feel it incumbent to keep up in the other professional and military branches. In fact, if called upon to do

the general duties of a medical officer, they feel that they should be excused. Then again, the effect of having specialists is to encourage other members of the corps to believe that it is not necessary for them to keep up in these subjects, hence there is a danger of lowering the general efficiency. If the surgery at our military hospitals is always done by men who have specialized, the larger majority of the corps will soon be "gun shy" when called upon to operate. Doctor Rixey, when Surgeon General, recognized this and demanded that all the young surgeons at naval hospitals operate. The laboratory expert or internist may find it difficult to keep up his interest in surgery, or the eye, ear, nose, and throat specialist is kept so busy with his specialty that there is no time to give to internal medicine or laboratory work. Recently we have seen medical officers concentrating on the problems of aviation, gas warfare, public health, and industrial welfare, and special sanitation of submarines. Others have found administrative duties, obstetrics, pediatrics, dermatology, and field service with the marines of special interest.

Shall we permit such specializing to continue? What is the best and most reasonable solution of the problem? How shall we meet the danger of losing young men, trained at the Government expense as specialists and then resigning to go into the more lucrative field of civil life? What is the effect on the general morale of the corps if the specialist can not be sent to do the routine duties of a medical officer when his turn for sea occurs? How can a selection board conscientiously choose specialists for promotion to the ranks which require executive and administrative ability acquired by long experience in the varied duties of the service?

Commander H. W. Smith, Medical Corps, United States Navy, attached to the Bureau of Medicine and Surgery, has given this subject considerable study, and permits me to quote from an article in the NAVAL MEDICAL BULLETIN, as follows:

"Closely as the practice of medicine in the service may parallel that in civil communities, so-called, military necessities often compel wide departures from the model. An instance in point is furnished by the limits set on specialism in the Navy. There it must always be an anomalous specialism in which the particular is not pursued to the exclusion of the general. Therefore, the bureau, desirous as it is of fostering the spirit of research and the precision of specialism, nevertheless will be governed in framing its educational program and in making assignments to duty by the principle that specialism with us can not be followed exclusively. The acquisition of a specialist's information in one field is altogether admirable, but it must always be superposed on a working knowledge of *all* duties which a naval medical officer may be called upon to perform. *Spe-*

cialization can not be allowed to unfit a medical officer for general duty nor to exempt him from it.

"Rarely, and then only under special circumstances, will officers just graduated from the Naval Medical School be launched forth-with on a career of specialism. Instead, those officers who have been in the service for a period of several years will, at the expiration of a cruise, be given instruction in the subject they have chosen, and subsequently will be ordered to duty where they may practice it as a specialty. Similarly, men who have served longer and who have had opportunity to manifest aptitude, will be given instruction of a more advanced character; for example, a man who is known to be an able general surgeon may elect a course of study in the surgery of the brain. From among men who have been able to follow this progression will be drawn chiefs of service, professional executives, and coordinators.

"The bureau does not feel compelled to extend active aid to all officers equally, believing that it should grant unusual opportunities for development only to those who have expressly signified their intention to remain in the service and who have already been in the service sufficiently long to have demonstrated their initiative, ability, and industry. Conversely, medical officers need not fear that the display of these qualities will fail of reward, for nowhere as in a military service are ability and accomplishment so sure of gaining recognition. In making its selection of officers for training and appropriate duty afterwards, the bureau will have as guides its knowledge of officers and such information as may be obtained from records, reports of fitness, and the (new) personnel sheet of the inspection report. Further, it will be of assistance if individuals desiring training will see that their applications are on file, and those possessing special experience will make that fact known to the bureau.

"The specialties referred to in the preceding paragraphs are those intimately connected with the practice of medicine. Besides these, there are other subjects that are undeniably of greater importance in the naval service, such as aviation medicine, field service with the marines, chemical warfare, public health, and industrial medicine—subjects that carry a strong appeal to those who by temperament, inclination, or lack of opportunity fail to follow the lines of professional development laid down. Some of these subjects, in the present state of medicine, are commonly regarded as collateral specialties or of minor importance, and for this reason many officers exhibit hesitation in identifying themselves with them, alleging that they do not pertain directly to the career of a naval surgeon and that their pursuit may in the long run prove unprofitable. The bureau dissents strongly from this view, regarding the attitude taken as

not founded on a just estimate of the relative values and as unfortunate in its effects on the mission of the Medical Corps."

Commander P. S. Rossiter, Medical Corps, United States Navy, attached to the Bureau of Medicine and Surgery, whose duty as detail officer permits him to have intimate knowledge of the value of specialists to the corps, in a letter dated 27 July, 1922, states as follows:

"I find no difficulty in placing these men where their services will be of value, and where their specialty will either be fully utilized or at least kept alive.

"Some of these men we can place on hospital ships; some with the expeditionary forces; some on flagships where their services will be available either to the fleet, division, or force; some can only be placed where they will be able to carry on their specialty on their own ship, but, even so, if their interest is sufficiently great, they can keep the spark alive.

"Undoubtedly, it is of great value to the service to have men well developed along certain special lines, but I feel equally sure that it would be most detrimental to the efficiency of the corps should they give entire attention to these specialties, as we must have men who can go to sea as 'medical officers,' and to establish a group of shore-going or fancy-job men would be destructive of morale, as it would tend to create a seagoing and shore division of the corps, for which reason I believe most emphatically that they should not give their entire attention to their specialties but must keep up with the other subjects required of a naval medical officer."

Although there are some senior medical officers of the Navy who are in favor of intensive specialization, it is evident that those who are in a position to judge the relative value of general versus special training are in accord as to limitation of specialization in the Navy. *From a practical standpoint the Bureau of Medicine and Surgery's present policy, as expressed in Commander Smith's article, would seem to solve the problem.* For the greater efficiency of the corps it is undoubtedly wise to concentrate on the training of medical officers for general duties as military surgeons, competent to be sent to any of the varied duties the service demands. If a young medical officer elects to devote special attention to any one branch, it should not be at the expense of the other branches.

It is well to remember that Admiral Rixey, when Surgeon General, developed a corps of operating surgeons by requiring all the younger medical officers to operate under the supervision of the senior surgeons. Although some showed greater skill and aptitude than others, the majority were prepared to handle any emergency operation and the routine surgery which occurs in the Navy. In a similar manner, by change of service at naval hospitals, assistants

can be trained in the general duties of medical officers, by working under the supervision of older men in charge of the surgical and medical service, laboratory, X-ray, eye, ear, nose and throat, etc. After a reasonable period of varied service, say 10 years, which should include at least one tour of hospital service, medical officers might be permitted to take courses to develop a chosen specialty. By this time there will be a background of experience in general practice, which should be required not only for military but for civilian specialists, if their opinions are to be sound and not biased by their specialty. The Bureau of Medicine and Surgery, by means of efficiency and other reports, is able to know which medical officers have attained proficiency in various specialties. In assigning duty this would be kept in mind and the work of the Medical Department as a whole conducted more efficiently.

In view of the difference of opinion among medical officers as to the need of specialists in the service, it is believed that a discussion of the subject is timely and will help to clarify the situation. Let us not forget, however, that well-trained military surgeons are in reality a corps of specialists requiring their best efforts to keep qualified for the many duties they may be called upon to perform. When we further specialize the military specialist it should be with a clear understanding of how to guard against the dangers of over-specialization.

THE EQUIPMENT OF TRANSPORTS DURING THE WORLD WAR.

By J. J. SNYDER, Commander, Medical Corps, United States Navy (late Force Medical Officer, Cruiser and Transport Force).

PROLOGUE.

The transportation of men at sea has always been a problem of magnitude, but never until the World War was it rendered so hazardous, as the submarine was an unknown quantity in any previous war in which troops had to make a sea voyage to reach the scene of their activities. The subject has interested me since my entry into the service, but I never was able to get in touch with much literature bearing on it. Campaigns are described in detail, but not the method of fitting out the troopships which carried the soldiers to the seat of war.

Many of the problems which vexed the medical officers fitting out troopships during the World War must have arisen in the past, but if they complained, or put their troubles on record, they must be hidden in long-forgotten files. The doctor, I am certain, has always been a not unimportant member of expeditions, warlike or exploratory, and I like to think of Aesculapius, the "Father of Medicine," not as he is depicted, as a decrepit old man far more in need

of a nurse than able to answer an urgent call in the night, but as a robust young man, skilled in his profession, and resembling the fine young men who answered the call and chose the sea and its dangers as their field of service during the late war.

Can you not imagine him answering the summons when Jason needed a "fleet surgeon" for the Argonauts and asked him to take the office with all its responsibilities and anxieties? Do you not think his advice was sought as to how long a rower should be kept at an oar before being relieved, or what kind of leather made the best covering for the rowers' benches, or, when a landing was made, whether the camp site was healthy and the water fit to drink? Do you think, because he was the most skillful in treating the wounds made by arrows, or in soothing the bruises made by stones thrown from a distance, or in concocting balsams for the rowers' chafes, he was not esteemed or consulted and his advice taken? Do you not think, too, that his advice was taken when the stores for a long voyage were selected and the amount to be issued was considered, and when a change in diet was thought necessary? Do you think an expedition like Jason's in search of the Golden Fleece would be remembered through the ages if it were not an example of high endeavor, and do you think such an expedition would creep timidly along the coasts? No! It struck out boldly, breasting the unknown, uncharted seas, filled with all the terrors the vivid imaginations of a primitive people could conjure up. Did it return flushed with success, and did its survivors in after years, when their hair was gray and their steps feeble, sit by the fire with their grandchildren on their knees and tell them their famous quest, or was it a failure, and the survivors objects of pity because their courage had failed when in sight of the goal and they returned to try to explain and could not?

Always by land or by sea great achievements, or even their failure if the idea back of it awakened the conscience of a people, have appealed, and the story has lived. And in every great campaign you read of the physician being present. Did he accompany it only for pecuniary gain? No! It was the relief of suffering and the amelioration of the hardships to which all were exposed which appealed. And as the physician followed the armies of his day so also did he follow the sea; for his fellow man at sea needed him, and the mind of the physician has always been an inquiring and adventurous mind, and who knew what great secret of life lay beyond the horizon, and might not he be the one to discover it?

When Columbus sailed on his quest he took a doctor with him, and his account of the voyage showed him to be a man of ability and research, and I do not doubt that he was frequently consulted on other than professional subjects.

When at the last great day the roll is called of the doctors who followed the sea in clear or stormy weather, where the tropic sun burned or the icy winds tried the souls of all their shipmates as well as themselves, or of those in war, where the lurking submarine made the sailorman's "no man's land" the "width of the rolling, tossing ocean";¹ than I am sure the physician's creed of honor, courage, and honorable service will serve to steady him for the last great adventure and admit him to the Presence as one who tried to make the path of his fellow man easier and his sufferings less.

It will be an honorable company, not through high-sounding titles but through achievements and deeds of self-abnegation, that will last so long as physicians are needed, and these reach from the cold of the Lena Delta to the jungles of Africa.

When war broke and our men were needed on the fields of France the transport service became necessary, and the doctor had to take his place in the scheme of things. That he was deemed necessary was shown by his presence. That his work was satisfactory is not for me to say; the record speaks for itself—a record of not thousands transported, but two and one-half millions, with a small death rate in the face of a virulent epidemic. In future years, when the medical history of the World War is written and the transport record is given to the public, then the survivors can say with pride, "I helped make that record"; and as the years shorten for them and the shadows lengthen they too will tell the tales of the sea, as has been done ever since man first "went down to the sea in ships and saw the wonders of the great deep and His works therein."

THE TROOPSHIP.

During the World War one of the major problems confronting the American people was the transportation of its army to the battle fields of Europe. To achieve this, it became necessary to procure suitable ships and equip them for this purpose, and it was an onerous task, but the difficulties were overcome and our troops, in ever increasing numbers, thrown into the conflict.

Never before in the history of the world were such numbers carried such a distance and with so little loss.

Now my task is to describe the fitting up of the medical department of a transport, and any other matters that might be of interest to medical officers.

As my connection with the transport service dated from August 8, 1917, when I reported on board the *Vaterland*, later renamed the *Leviathan*, and continued until August 5, 1919, when I was detached

¹ Martin in Report to Commander Cruiser and Transport Force.

from duty on the staff of Vice Admiral Albert Gleaves, United States Navy, commander of the cruiser and transport force, where I had been serving as aide and force medical officer of the cruiser and transport force, I feel that I have gathered some experience in the transportation of troops and the outfitting of the medical department of a troopship.

The *Leviathan* was a coal-burning passenger steamer 952 feet in length, 100 feet in beam, and with a draft as a transport in the neighborhood of 40 feet. Her decks numbered 14 and her maximum troop-carrying capacity was 12,000 men. Her crew all told numbered about 2,500 of all ratings. Such was the ship I joined at Hoboken on an August morning in 1917 and, upon reporting, found that no work had been done toward converting her into a transport except some on her engines.

However, the plans were being drawn by the naval constructors in charge of the work. I proceeded to make a careful inspection of the ship so as to become acquainted with her possibilities as a transport and to find a suitable location for a sick bay sufficiently large to accommodate the sick of such a great number of troops as would be carried.

As a passenger ship the vessel had three spaces set aside for the care of the sick, but they were in different parts of the ship and their aggregate would still be insufficient. Two of these spaces were later utilized for holding sick call for troops and crew, and later for crew only, when sick call for troops was held in the troop spaces.

In my search for a suitable location for a sick bay I found such a place in the "social hall" on "B" deck, and it was allotted, together with the adjoining rooms which were adjuncts in its former functions. It was admirably adapted for use as a sick bay, being amidships, comfortable, large, airy, well lighted during the day by a skylight and large windows. This space was allotted by the naval constructors, and, if my memory serves me correctly, measured 69 by 72 feet. We drew plans for its division into three wards—medical, surgical, and an officers' ward. The three wards had a total capacity of 142 beds, divided as follows: Medical, 84; surgical, 48; and officers, 10. The officers' ward was an innovation which soon proved its worth. In the medical and surgical wards the beds, taken from the old steerage compartments, were arranged in groups of eight, two high, while in the officers' ward single iron beds, taken from first-class staterooms, were installed. The German steerage bunks installed in the sick bay had been so constructed that any number could be connected, but for ease of access they were installed in groups of eight; that is, four in the lower tier and four in the upper. As wide an alley as the space would permit was left between the groups. To steady those groups 2 by 6 wood scantlings were run

athwartship and secured to the ship's sides, which had been wainscoted to a height of 7 feet to protect the fine carved oak ceiling which added much to the appearance of the sick bay. The wards were divided by a 7-foot bulkhead. As the overhead deck was about 20 feet above the sick bay deck, the entire overhead space was open, allowing the free circulation of the air.

Owing to the size of the wards, and to prevent unnecessary noise and confusion, a call-bell system was installed, with the indicator at the desk of the nurse on watch, and there was a push button between each pair of beds. It early proved its worth. Each bed in the officers' ward was similarly equipped. As the number and arrangement of the beds did not occupy the entire floor space of the "social hall's" vestibule, the forward end of the room was bulkheaded off, and a small room bulkheaded off of this vestibule at each side. The room on the starboard side was at first intended as a dispensary, but soon became the officer of the day's office, while the room on the port side, first used as a quiet room, was converted into a laboratory, and was so completely equipped that the commander of the cruiser and transport force issued a bulletin (Appendix 1) on the subject, calling attention to its existence, and that it was available for other ships of the transport force.

There had been an alcove at the forward end of the "social hall," with a stage for the ship's orchestra, and this was selected as the proper space for the operating rooms, two of which were installed against my remonstrance on the stage, but later had to be placed on the level of the sick-bay deck, thus justifying my remonstrance. Just forward of the clean operating room on the port side, the "social hall" barroom had been located. It was easily converted into a sterilizing room, while a storeroom on the starboard side was converted into a lavatory and latrine. As this room was too small to accommodate the number of basins necessary for the sick, in addition to a shower bath and latrine trough, four basins were installed in the starboard passageway leading from the sick bay forward.

A large barroom just over these rooms on "A" deck was converted into a medical storeroom. Half of it was at first intended as an X-ray room, but after mature consideration this was deemed unnecessary, and the space was used for stores. A separate steward's room just forward of the sterilizing room on "B" deck was fitted up as a lavatory for the officers' ward.

ISOLATION WARD.

Just abaft the after end of the sick bay the main stairway of the ship extended from "A" deck to "F" deck. On "A" deck, just abaft where it ended, was the gymnasium for the first-class passen-

gers. It extended almost the entire width of "A" deck, and was isolated from the remainder of the ship to a great extent. The gymnasium equipment was removed and it was fitted as the isolation ward, with two units, one of 10 and the other of 8 beds. In the one unit a tub, washbowl, and commode were installed. In the other a small space for a washbowl and closed stool was bulkheaded off. Plumbing installation was out of the question in this unit owing to structural obstacles. As it was soon found that these two units, containing 18 beds, were insufficient for the care of the cases of communicable disease, the open space over the main stairway leading from "A" deck to "B" deck and just forward of these units, was decked over, inclosed, and divided into two rooms, each of which was fitted with 10 bunks. This gave an isolation space of 38 beds in four units, well away from either soldiers or crew.

SPACES FOR THE CARE OF THE SICK.

As mentioned before, there were three spaces set aside for the care of the sick passengers, and two of these were utilized for holding sick call for soldiers and crew. For those of the crew quartered forward, and the troops in the forward compartments, a suite of three rooms on "D" deck, which had been occupied as quarters by the doctor assigned to care for the first-class passengers, and as office and dressing room, was fitted up as a dispensary, and a store-room attached to this suite was used as an auxiliary medical store-room. Sick call for troops and crew was held here twice daily and any requiring hospital treatment were immediately transferred to the main sick bay on "B" deck, previously described. For the crew and troops quartered aft the quarters previously occupied by the doctor employed to care for the second and third class passengers on "E" deck were used. They comprised two rooms.

Drugs in common use, surgical dressings, and morning reports of sick, together with admission slips, were kept in each dispensary for the convenience of the medical officers holding sick call and the consolidated morning report of sick was made up from them in the senior medical officer's office, which occupied a stateroom on "B" deck on the port side just forward of the main sick bay. This arrangement held during my period of service on board, but my relief had the sick call for the soldiers held in the various compartments they occupied, which was more convenient, owing to the large number on board. These local dispensaries continued to be used for the crew.

As mentioned previously, the "social hall," which was converted into the sick bay, had large windows on either side. They could be used as doors during the day, and when opened allowed the free circulation of air, and as the sick bay was about 70 feet above the water line, there was no danger of the sea coming in. There were no other

means of ventilation. At night, with every aperture that would allow light to escape carefully closed, the ventilation in this large room was only fair.

While workmen were busy fitting up the sick bay I was also busy gathering things from the German equipment still on board that could be used profitably in the care of the sick. Bedside trays, ladders for upper bunks, linen, and a few surgical instruments and serviceable appliances were put to use.

As the ship's laundry was too small to be of profitable service, it was never placed in commission while I was attached to the ship, so it was necessary to procure enough linen to allow for a round trip.

Owing to the size of the ship, and the large number of troops she could carry, everything had to be done on a large scale, and it was necessary for me to visualize what a body of 10,000 men crowded on one ship meant, and what number might be sick, and what would be required for their care, both in the size of the sick bay and the necessary stores.

The original specifications for transports called for sick bays large enough to care for 2 per cent of the troops carried but not to exceed 50 beds. This was rather a handicap, but as the space was available and my assertion that 50 beds would just about care for the crew, all the beds that the space would hold were set up. It was none too large; and on our first trip to Liverpool we had 28 cases of pneumonia, besides measles, mumps, scarlet fever, and other ailments. Every bed was occupied, and the wisdom of having an ample hospital space was demonstrated.

A plan for the sick bay drawn by Lieut. E. M. Hudson, Medical Corps, United States Navy, one of my many assistants, was forwarded to the bureau. It appears in the annual report of the Surgeon General, United States Navy, for the year 1919 (p. 64), together with the plans for the insane ward. These quarters for the insane were installed later while Commander George Tully Vaughn, Medical Corps, United States Naval Reserve Force, was serving as senior medical officer, and were most admirably adapted to the purpose. In fact, the quarters for insane officers were so comfortable that two returning Army medical officers obtained permission to occupy one of the rooms on their return from France. The quarters for insane officers occupied 10 rooms with their adjuncts on "D" deck, amidships. The dining room for second-class passengers on "D" deck was converted into quarters for the carriage of insane enlisted men, and part of the "D" deck promenade on the port side adjoining this compartment was inclosed with wire netting to prevent anyone jumping overboard. This space was comfortable and well adapted to the purpose to which put.

As the Army psychiatrists had claimed that few mentally defective would get aboard, I felt that the few I would be called upon to care for could be carried in one of the forward troop compartments, but in this I was mistaken, and the admirable arrangements described above were found necessary.

Owing to the great number of insane men that had to be returned (6,603 Army, 105 Navy, and 87 marines), the Navy Department entered into an agreement with the Army for their return, and the so-called and much maligned "cages" were installed on a number of transports and proved their worth. No critic ever devised a better or more humane method of transporting insane men, and it must not be forgotten that 3,000 miles of sea had to be traversed, and every precaution had to be taken to prevent men from jumping overboard.

The main sick bay on "B" deck had the first-class promenade deck on either side and this was utilized later for the return of tubercular patients, to which it was admirably adapted.

Before the sick and wounded were returned in appreciable numbers a diet kitchen was constructed, under the supervision of Commander H. A. May, Medical Corps, United States Navy, in a small room on the starboard side abaft the sick bay and between it and the wardroom messroom which occupied the old Ritz-Carlton restaurant on "B" deck and was invaluable. Such a special diet kitchen should be one of the indispensable adjuncts of the medical department of a troopship.

The "Hundshaus" on "A" deck was used as a sterilizing room. It was close to the isolation ward and was fitted up for the purpose. There was also a steam sterilizer large enough to receive mattresses, which was part of the original equipment of the ship when in the passenger service, but which was usually out of order during the time I was attached to the ship.

EQUIPMENT.

In fitting out we installed the standard Navy equipment in the operating room, and as the lighting circuit was on the "battle circuit," light was available at all times. To illuminate the operating tables from every direction, an oblong frame of inch iron pipe slightly longer and wider than an operating table and which carried 12 lamps with holophane shades was installed over each. The lamps were inclined at such an angle that the light fell on the center of the table. The operating room lighting was excellent and excited the admiration of British medical officers who visited the ship.

Excepting the bedding and furniture secured from the German stores on board, everything else was of the Navy standard type. I secured ample supplies as I felt certain, and my experience later

demonstrated, that sick and wounded would be brought home despite the submarine menace, long before peace or an armistice would be declared. Roughly, 20,000 were brought home before the armistice, and I wanted to be fully prepared for this contingency.

I made inquiries at several hospitals as to the number of sheets, blankets, pillowcases, and spreads that they found necessary to conduct the work properly, but received no satisfactory answers, the usual answer being that they had never considered the matter and had procured supplies as needed. As this was meager data to work from I made my own calculations and arbitrarily decided that 10 sheets, 8 pillowcases, 3 blankets, and 2 bedspreads were the necessary equipment per bed, and I wish to state that my judgment was good. All this bedding was drawn from the German supplies found on board.

Later, as force medical officer of the cruiser and transport force, it fell to my lot to supervise the outfitting of 70 troopships, and I followed these allowances with very satisfactory results.

As will be noted, the various adjuncts, such as diet kitchen and department for the insane, were installed some time after the sick bay proper had been constructed. The need for a diet kitchen had been foreseen, but I was unable to procure the necessary compartment. Later, when its need was seen to be imperative through the carriage of wounded, it was installed. I am free to admit that I had not anticipated the need of the special accommodations for the care of the insane, neither do I make any claim to the perfection of what I did install in preparation for the care of the sick, but I can say that what was installed functioned and was suitable for the work that had to be done.

Besides the sick bay of a troopship there are many other things on board in which the medical officer is vitally interested, and among them are the sanitation, cubic space per man, water supply, food supply, ventilation, bathing facilities, latrines, clothing, dental facilities, and his relations with the Army medical officers on duty with the troops embarked. These will be taken up in the order given.

SANITATION.

As soon as the plans for the vessel's conversion into a troopship were approved, workmen swarmed on board, and with ax, crowbar, and pick commenced to demolish the bulkheads between the compartments given over to the carriage of steerage passengers, and the rooms for first-class, second-class, and third-class passengers. After these were demolished and the débris removed and deck cleared for the erection of the troop standees, some method of quickly applying disinfectants had to be worked out.

The "transport sanitary regulations," which, as a member of the board appointed to formulate them, I helped draw up, called for the evacuation of the troop spaces daily, and advantage had to be taken of this time to see that they were placed in sanitary condition. (These regulations are appended, Appendix 2.) It was plainly evident that the decks could not be scrubbed daily with disinfectant solution and dried in time for occupancy by the time the occupants had to leave the upper decks, so I devised the scheme of utilizing fruit tree spraying apparatus to apply the selected solution before the deck was swept so as to keep down the dust and keep the decks in at least an approach to a sanitary condition. This proved to be a satisfactory arrangement, and it had a good effect on the troops carried, as it was a demonstration of the hygienic efforts made for their protection. Solutions of cresol or chlorinated lime were used, preferably the latter.

Another innovation that I urged and succeeded in having adopted was the placing of garbage cans in the troop spaces for the benefit of soldiers who suffered from my ancient enemy—seasickness. They were needed and saved the police parties much disagreeable work.

All garbage was disposed of by throwing it overboard at night, and a special garbage container was devised and installed at a convenient place on deck. This was most important.

Under sanitation comes also the subject of disinfection of the clothes and equipment of those suffering from communicable diseases and the destruction, or rather the eradication, of insect infestation. For this purpose steam sterilizers sufficiently large to receive a mattress were installed on all transports.

In the fitting out of cargo carriers as transports excellent sick bays were installed, with a bed capacity equal to 2 per cent of the troops carried, with isolation space for 1 per cent more, arranged in two distinct units. In equipping the isolation wards I recommended that utensil sterilizers be installed in the isolation wards of these new transports, but in a communication from the Bureau of Medicine and Surgery dated 31 January, 1919, this recommendation was disapproved, as the fitting out of these vessels was an emergency and there was difficulty in procuring these articles. However, I am still of the opinion that the isolation wards of troopships especially should be so fitted, as, owing to the crowded condition of these ships, every precaution must be taken to prevent the spreading of infection, and through their use all articles removed can be previously rendered safe for handling by nonimmune personnel.

Another thing that is of supreme interest to the medical officer along the lines of sanitation or disinfection is the presence of insect infestation of the troops carried. In Force Confidential Order 01, of 16 December, 1918, examination for vermin of all persons trans-

ported was ordered, and this examination was repeated in six days. In addition to this examination, which was made by medical officers, the soldiers were directed to make a daily examination of their clothing for lice. (Force Confidential Order 01, 16 December, 1918, is appended, Appendix 3.)

While the installation of isolation wards has a slight bearing on the subject of disinfection and sanitation, still they are related, as they have to do with the health of the ship's company and troops carried. I wish to state here that, in the building of isolation wards on the troopships it fell to my lot to supervise, I insisted on there being at least two units in each and that the space assigned was adequate. If possible three units were installed, so that many communicable diseases could be handled at the same time with the slightest danger of cross infection.

On a crowded transport no time could be wasted, and suspects had to be promptly segregated, and there never was any extra room where they could be berthed until a diagnosis could be made. Here the wisdom of always having ample isolation wards will prove their value. Besides the military value of keeping an organization "fit to fight," it is also necessary to preserve its morale, and the presence of communicable disease with no visible means of combating it will lower it.

As previously stated, we had 28 cases of pneumonia on our first trip to Liverpool on the *Leviathan*, besides measles, mumps, scarlet fever, and diphtheria, and at that time but two units in the isolation ward. The plan, first used in the service by the late Capt. H. G. Beyer, Medical Corps, United States Navy, of isolating the patient in his bunk in the sick bay by surrounding his bunk with bichlorided sheets and the rigid disinfection of everything that came from the cubical so formed was adopted, and if my memory serves me correctly we carried 46 measles cases in this manner and had no cross infections. Of course, each unit was complete with toilet, basin, and commode, and shower or tub. The absence of epidemics in the transport fleet showed that the medical officers were alive to their responsibilities and capable of handling any situation that arose.

Under sanitation also comes the duties of the medical officer as the advisor of the commanding officer, and also of the "first lieutenant," who is the officer most directly concerned, next to the medical officer, in the practical side of the keeping of the ship clean, and the cooperation between this officer and the senior medical officer or the assistant he delegates as sanitary officer will make the task of each easier and the ship more efficient.

To the first lieutenant falls the lot of carrying out the sanitary recommendations of the medical officer, when approved by the com-

manding officer, and cooperation here makes the work of both easier and more effective.

As the crew of a transport is only large enough to work the ship and man the battery, the work of keeping the troop compartments falls to the lot of the troops occupying them, and "police parties" should be promptly organized and instructed as to where the necessary cleaning gear may be obtained.

As the latrines always are a favorite place for the disposal of discarded articles, it is necessary to station a guard in them at the earliest possible moment after the troops arrive on board to prevent the discharge pipes from being clogged by discarded garments and so causing much trouble with the plumbing system.

The police parties previously mentioned were responsible to the first lieutenant for the cleanliness of the troop compartments, and had a heavy task, one which continued from the time the first soldier crossed the gangway until the last one disembarked. The amount of rubbish removed daily was large, but the system early developed soon resulted in the ship being kept in a very good sanitary condition; in fact, it really was excellent, considering that the vast majority of the men carried had never seen a ship before, had no idea of ship sanitation, and many had very primitive ideas of sanitation to begin with.

CUBIC SPACE PER MAN.

The Army Field Service Regulations of 1915 state that in estimating the troop-carrying capacity of a ship, one man can be carried for every 5 tons, gross displacement, in a small ship, and for every 4 tons in a large ship. I noticed that this worked out fairly well in practice.

As to the cubic capacity of the troop compartments, this varied on various ships and in different compartments on the same ship according to the shape of the compartment, some having as little as 46 cubic feet per man and others as much as 120 or more. The estimated allowance was 70 cubic feet per man, and this was a fair rule to follow. Remember, this space had to contain not only the soldier but his equipment, which was always bulky and awkward to stow, and his wire or canvas berth. The capacity of a compartment was often determined by its shape, an irregular compartment not allowing the full use of its cubic capacity or area. On cargo carriers converted into troopships the lower hatches were frequently utilized for the installation of bunks, while the upper hatches were fitted with ladders to allow ingress to or exit from the compartments which they served.

The transport regulations required that the troop compartments be left clean by the troops and that a large police detachment be left

behind to do the necessary policing. This resulted in the ship being left very clean, and in the interval before the next detachment was embarked the compartments were painted and shellacked and when necessary fumigated.

Among the efforts made to add to the sanitation of the transports was the screening of the isolation wards and butcher shops.

The following paragraphs from the annual sanitary report of the force medical officer, cruiser and transport force, for the year 1918, are inserted for the purpose of illustrating the daily sanitary routine of a troopship. These were the most prominent methods reported.

(a) "Daily inspection of living compartments by a medical officer, usually in company with the commanding officer of troops. As Army medical officers were ordinarily assigned as sanitary inspectors for the compartments occupied by their organizations, and worked in conjunction with the naval medical officer assigned as sanitary inspector, and were instructed by him in ship hygiene, a satisfactory standard of cleanliness was quickly reached and maintained.

(b) "Daily disinfection of decks by spraying with a disinfecting solution, either 5 per cent creosol compound or chlorinated lime, and disinfection of swabs by boiling or immersion in one of these solutions.

(c) "Careful washing down of all bulkheads, decks, and bunks, fumigation and cleaning of life preservers, and washing of canvas bunk bottoms where they are in use.

(d) "Fumigation of the entire ship when necessary.

(e) "In case of communicable disease the careful disinfection of the infected compartment, isolation of the patient, and examination of contacts, where practicable their segregation, or, if still in port, removal from the ship. Under this heading can be placed the wearing of gauze masks as practiced on some ships during the influenza epidemic of September and October."

While all ships had a steam disinfector of the Kinyoun-Francis type, some had an air-tight disinfecting room for gaseous disinfection in addition.

WATER SUPPLY.

This is one of the most important problems that confronts the commanding officer of a transport. The ship's tanks are adequate for the crew and the number of passengers she was designed to carry, but when converted into a troop ship their capacity may be inadequate and their number must be increased if this is possible, or the amount of water allowed per person carried, whether soldier or member of the crew, must be restricted to the limit of discomfort or even hardship or the number carried reduced. The daily allow-

ance of water per person was limited to a minimum of 5 gallons per person. "Sanitary" scuttle butts should be obligatory in the engine rooms and fire rooms.

Compared to the old days of the sailing ship this was a liberal amount and was sufficient. Of course it did not allow of fresh-water bathing except for the sick bay, but there never was any limitation of the drinking water, where hardship usually first manifests itself, and an additional precaution was taken of having the soldiers keep their canteens filled so as to prevent confusion around the scuttle butts, and to have each provided with a water supply in case it became necessary to abandon ship.

Scuttle butts in the proportion of one spigot for 350 men were installed, with a sentry posted to prevent waste and report any necessary repairs.

Lieut. J. A. B. Sinclair, Medical Corps, United States Naval Reserve Force, made an ingenious adaptation of a wire electric-light guard that prevented the spread of sputum-borne diseases through the infection of the sanitary drinking-fount nipple by the drinker grasping it with his lips when engaged in drinking. The wire frame allowed the escape of the unconsumed water and at the same time kept the drinker from touching the pipe with his lips.

The amount allowed was sufficient to give the galley all the water necessary for the proper preparation of food. A plentiful supply of cold water is one of the luxuries of a troopship.

It is needless to say that when distilled water can not be furnished for drinking and culinary purposes, that chlorination is necessary and can be best done in the ship's tanks. As practically all of the American seaports have modern water systems and supply chlorinated water to the consumers when water is purchased for ship's use, it is fairly safe and a second chlorination will neutralize the water barge or pier contamination.

An apparatus for the chlorination of water as it is taken on board was tried out on the *Leviathan* but was not a success. It is described in the force medical officer's report for the year 1918.

FOOD SUPPLY.

The food supply of a transport is a matter of great importance, and its care and preservation are matters that deserve much consideration. That the Supply Corps had given it this consideration was shown by its success in the feeding of the troops carried and the freedom from complaints as to either the quality or quantity of the food served. I can only add my feeble words of praise and approval to those already received for its method of feeding many thousands of men.

As division surgeon, and later as force medical officer, I made it my business to interview soldiers on every transport boarded as to the food, and few were the complaints heard, and they were usually from a disgruntled individual who had most likely cultivated the habit in his home long before he entered the Army.

It was noticed and commented on by Commander P. S. Rossiter, Medical Corps, United States Navy, during an inspection trip made abroad, that the returning soldier craved fresh fruits, and he recommended that they be supplied in liberal quantities as part of the ration.

The only part of the Navy ration to which the returning soldier did not take kindly on board ship was the navy bean for breakfast, and it was the subject of very unkind remarks. It is not an appetizing dish when prepared and served in large amounts, or when the returning soldier is seasick. In the Surgeon General's report for the year 1919 my statement reads as though I had objected to the navy bean as part of the Navy ration. This was not the case. As stated above, the objection was on the part of the soldier, and I felt it to be my duty to report faithfully any objections that could be remedied in any future transportation of troops on a large scale. The ration is ample, especially for men who are used to strenuous drills and the hard work of the training camp, and then suddenly marched on board ship and put in meager quarters with only a limited amount of exercise per day on board.

The numerous components allow a fairly varied menu and its caloric value will sustain men undergoing hard service.

The recommendation of Rossiter is a reasonable one and gives a much appreciated component, especially to men who have been serving in the field where it is impossible to procure fruit.

On the *Leviathan* the troops were only fed twice a day, but as the voyage was about eight days there was no suffering. At first, men accustomed to three meals a day missed them but soon accommodated themselves to the change. The troops were fed cafeteria fashion on board all troopships and had to wash and care for their own mess gear. Dish-washing stations were established at convenient places, with steam coils to heat the water. Dish-washing machine took care of the other mess gear.

In the preparation of food on board the transports it was necessary to employ soldier details in the galley to help prepare and serve the food. This allowed the carriage of more soldiers, and the ship's complement was sufficient to cook for the regular complement of officers and men on the return voyage.

In the fitting out of the cargo carriers as troopships the galley received careful attention from the officers interested. There was allowed in the ship's "coppers" 2 quarts for each man carried—

double the amount, I was informed, ordinarily allowed. There were 5.8 feet of range surface allowed per hundred troops carried.

As the weight of the ration components is roughly 4 pounds, it can readily be seen that ample storage and cold storage space had to be provided for the thousands of men carried. The feeding of the troops was carefully worked out and the routes to the food stations laid down so that there was no congestion and the troops were quickly and quietly fed.

This only concerns the medical officer in that he must be cognizant of the quality and quantity of the food, the cleanliness of the preparation, and freedom from contamination in the manner in which it is served; but it is also a matter of interest to know how men are fed on a crowded troopship and whether the food is of such quality that no digestive disturbances will result.

An important thing is the care exercised by the troops in the washing of their mess gear. The men should be supervised by their company officers in order to see that they scalded it. Sputum-borne diseases can be most easily disseminated at the tanks used for cleaning mess gear unless this precaution is taken.

VENTILATION.

The problem of ventilation of a transport is one that engrosses the attention of the medical officer and causes him much worry.

As a passenger ship a certain amount of artificial ventilation had been installed in the *Leviathan*, but in her conversion into a transport some of it had been destroyed and some rendered useless, so that the subject had to be carefully considered. It was found necessary to install fans and conduits on practically every transport, and these were not always available when the ship was being turned into a troopship, or the time was too short to allow of the work being completed when the troops were ready to come on board. However, the necessity of proper ventilation was appreciated and every effort made to supply a satisfactory amount.

During the World War when the troopships crossed the sea with every external light extinguished and hatches and ports that would allow the feeblest glimmer from the few necessary internal lights carried in passageways or quarters, closed, the supplying of air to the troop compartments became a serious matter. These compartments were crowded, 70 cubic feet per man being allowed, and this contained a wire or canvas bottomed bunk of the following dimensions: Length, 80 inches; width, 25½ inches. Space between bunks: Lower, 26 inches; middle, 20 inches; top, 20 inches. Width of aisles, 21 inches. And with the soldier and his equipment it can readily be understood that the air must be supplied in large amounts and with frequent changes. With an electric plant designed to

care for the original number the ship was expected to carry, it was not always easy to enlarge the ventilation system, as there would either be no room for additional dynamos, or the boiler power did not allow extra installation. Every effort was made through wind sails, trimming of ventilators and the carrying of the ventilating conduits to the dead spaces of the compartments to better the condition.

When cargo carriers were converted into troopships the conditions mentioned above were very pronounced and here the efforts were limited to increasing the ventilation through the installation of cowed deck ventilators, as there was seldom dynamo or boiler capacity available to increase it. It was found that to give each occupant of the upper 'tween-deck compartments 2,000 cubic feet of air per hour each man had to have 3 square inches of ventilator discharge area; while for the lower 'tween-deck compartments it was necessary to give him 3.4 square inches of discharge area. (See Surgeon General's report for 1919, p. 47.) These figures were furnished the supervising quartermaster by the force medical officer of the cruiser and transport force after a careful investigation of the subject by his assistants and myself.

As these cargo carriers were put in commission after the armistice, when the necessity for screening lights no longer existed and hatches could be kept open to assist ventilation, this amount might not be adequate under war conditions, but would come very near to solving the difficulty.

As troops are crowded between decks and frequently must be kept there for many hours without being allowed access to the upper decks, it becomes necessary to furnish air in large amounts, and this can only be accomplished by the installation of an adequate ventilating system.

The troop-carrying capacity of a ship may be limited by a faulty ventilating system which does not allow of her full carrying capacity to be employed, and time and money are both consumed in correcting it. In the designing of troopships especial attention should be paid to the installation of a forced ventilating system with a minimum capacity of at least 2,000 cubic feet per man per hour without the assistance of natural ventilation, which will prove a broken reed in time of war, when all light exits must be closed and with them most of the air inlets. A supply system is the only method that need be considered, except for the heads and isolation wards, which should have both supply and exhaust system.

Care must be taken in the arrangement of the conduits and discharge louvers that they do not interfere with the standees, and that the discharge of air is not directly over a bunk, or that bunk will be uninhabitable and unsafe, as the air current will be so strong

as to endanger the life of the occupant through chilling. Whenever a louver discharges directly upon a man he will usually close it, and so limit the air to the compartment, and frequently does so by stuffing clothing in it. As troop compartments are usually large, to insure a full supply of air the fan should be located as near as possible and the discharge pipes should have as few turns and angles as possible.

BATHING FACILITIES.

Cleanliness is said to be next to godliness, and, like it, is frequently difficult of attainment. This is especially true on a crowded trooper, where fresh water for bathing purposes for the soldier only exists in his imagination, and he has to be content with salt water, frequently at the temperature of the North Atlantic in mid-winter, and where he has to compete with 74 of his comrades for the privilege (?) of standing beneath one of these showers about twice a week, when the bathing schedules are well arranged.

Showers were installed in the proportion of one shower for each 75 men, and liquid salt-water soap was supplied. When the supply carried was exhausted, a substitute was manufactured on board one of the transports (*Zeelandia*) and gave nearly as much satisfaction as the much vaunted variety furnished by a commercial company. (See Information Bulletin, No. 75, Miscellaneous, of August 12, 1918. Appendix 4.

On many of the transports both hot and cold salt water were supplied. Fresh water was supplied the sick bay, bathroom, and isolation ward. An important thing, and one that should be borne in mind, is the installation of a heating system in the troop bathrooms, especially when the bathrooms are installed, as on the converted cargo carriers, on the weather deck. Cold and drafty bathrooms are a menace to health and a deterrent to their use.

Basins were installed in the proportion of seven per hundred soldiers carried; were arranged either in the wash rooms or troop compartments; were supplied with water through spigots conveniently arranged, and the waste water was carried off through drain-pipes from the trough over which the basins were located. On a few of the later transports these troughs were of metal, porcelain lined, and of an excellent sanitary type. Liquid soap was furnished in the usual globular container, and these were supplied at convenient intervals over the basin trough.

As officers were carried in staterooms, the usual stateroom fixtures sufficed, but where staterooms had to be built, as on the upper 'tween decks of a cargo carrier, bowls and pitchers were supplied in the rooms and in bathrooms. Both officer and soldier supplied his own towel.

The cast-iron porcelain-basin trough is far superior to the wooden trough, and unless extreme need for the vessel prevents, should always be the type installed. Either enameled, porcelain lined, or tin basins, preferably the latter, are used, and are suspended on rings over the trough. With the type of trough described there is no difficulty in keeping it in a good sanitary condition. The bathrooms should have tile decks and be well lighted. A mirror should be installed in each bathroom for the convenience of the troops.

LATRINES.

These were installed in convenient locations, but never below the water line where mechanical means for the disposal of their contents was necessary. Twenty-two inches of seating capacity was supplied for each 30 men carried. They were usually of the intermittent flush trough type and were constructed of rolled sheet metal, or wood, lead lined. On a few very late transports they were of metal, porcelain lined. This type is such an improvement over the plain metal, or wooden variety, lead lined, that no other type should be considered in the future. They should always be placed fore and aft, instead of athwartship, as the rolling of the ship when athwartship frequently resulted in their contents being spilled over the low end and so causing much disagreeable and unnecessary labor, besides putting them out of commission temporarily.

The practice of putting rigid bulkheads between the seats is to be condemned, unless these bulkheads are hinged, like the leaves of a book, so that they may be turned aside to allow ease of access of cleaning. The latrine trough should have the rear wall vertical while a fair slope is given to the front wall. This will prevent the soiling of the rear wall and render policing easier and more thorough. The seat, of wood, is usually a 6-inch plank running along the front edge. It should be of hardwood and not painted, and should be so hinged that it can be turned up to allow the cleaning of its under-surface.

The deck in the latrines should be of a durable variety of tile, and the latrine is one of the spaces on board ship which should have special attention given to its lighting, heating, and ventilation—the latter should be of both supply and exhaust. No chemical “disinfectors” should ever be installed; proper policing will keep them sanitary. It might be advisable to keep some latrine troughs in store ready for installation on board any ships suddenly called upon to transport troops. As previously stated, one seat 22 inches in width is the allowance for 30 men, and the allotted number should never exceed 32. If the space allow, one seat per 25 men carried should be installed.

CLOTHING.

During the World War much inclement weather was encountered on the North Atlantic, and, as a vigilant watch had to be kept for enemy submarines, it was necessary to supply special clothing for the men on lookout. Extra heavy underclothing, and heavy duffel gray "windproof" top clothing was issued, and was very popular. This outfit was too heavy to be worn while at work between decks but was a great comfort to the men on watch and added to their efficiency and health. The issuance of special clothing was a recognition of the fact that the regular Navy uniform is not adapted to all climates and conditions of service, and this heavy war uniform is one well adapted where men are exposed to inclement weather.

DENTAL FACILITIES.

The Dental Corps certainly proved its worth during the war and nowhere more so than in the transport service. While each transport did not carry a dentist as one of the permanent complement, every effort was made to afford dental facilities through having a dentist ordered on board for a trip to France and back, and for his use a portable Army dental outfit was put on board. In addition, dentists were ordered on board transports during their period in port between ships, and the teeth of the crew overhauled and as much work as possible done. To facilitate this, dentists were assigned as assistants to the force dental officer on the staff of the commander, cruiser and transport force, and furnished with an Army portable dental outfit, and as soon as possible after the transport arrived, reported on board and started work.

In addition to doing the work required by the ship's company, any emergency work required by the troops was done, and occasionally assistance was rendered by members of the Army Dental Corps on board.

I have only my memory to depend upon, but I am of the opinion that there are fewer admissions for digestive disturbances since the Dental Corps has been established than before and that the teeth of all on board ship are in better condition. In the planning of the medical department of a troopship care should be exercised that a proper dental office is provided for—well lighted, ventilated, and with convenient electric outlets for the attachment of instruments and appliances.

RELATIONS WITH THE ARMY MEDICAL OFFICERS ATTACHED TO THE TROOPS EMBARKED.

To a certain extent this will depend on the personality of the officers concerned, but on the whole these relations are cordial. The

Army medical officer recognizes the fact that he is out of his element; that strange conditions confront him; that he may be handicapped by seasickness and unfamiliarity with the handling of sick at sea, and unacquainted with the resources available. Usually he is very thankful there is a naval medical officer handy to relieve him of patients who require more care and attention than he is able to give them in a troop compartment. The result is that he turns them over very early to the ship's doctor, knowing that the resources of the ship will be used in their behalf. The senior medical officer of the ship is the senior medical officer on board so far as the care and treatment of the sick and the sanitary condition of the ship are concerned. He can call upon any or all of the Army medical officers on board to assist in the care of the sick, and the Army Hospital Corps personnel can also be utilized in the same manner.

The Army medical officers are required to hold sick call for their respective commands and make sanitary inspections of their quarters, and for this duty one is usually detailed and he usually accompanies the ship's sanitary officer in his inspections.

When a soldier is transferred to the care of the ship's doctor, he becomes to all intents an inmate of the hospital, and his papers are usually indorsed by his commanding officer and accompany him, while his arms and equipment remain with his command. Form 52, which is practically a "hospital ticket," is the Army medical form which accompanies him. Of course this may be changed at any time, as it is dependent upon the forms the Army has in force at the time. The forms and returns required by the Army when a port is reached also depend upon the forms that are in vogue at the time, and also those that are required by the port authorities in addition.

LOCATION OF THE SICK BAY.

The fact was early recognized that the sick bay of a troopship had to be large, so as to accommodate a large number of sick, accessible and easily evacuated in case of submarine attack, in a quiet, comfortable part of the ship, as free from motion as possible, well ventilated and cheerful. These conditions were only met by placing the sick bay amidships, in the superstructure, in part of the space ordinarily given over to first-class passengers. While this location limited the number of officers who could be carried, many a weary and wounded soldier was thankful that he had reached a haven where he could be cared for with a minimum of pain and distress. Under no circumstances should the sick bay of a transport be placed on one of the lower decks when the ship has a "house" on the main deck in which it can be placed. On a cargo carrier, where the superstructure is only large enough to accommodate the ship's officers, it must be placed on the upper 'tween-deck, and should

be located as near amidships as possible. As convenient a location as can be found on the present design of cargo carrier is just abaft the No. 3 hatch. This allows of free access and ventilation. The amount of cubic space per patient is a variable quantity in an improvised sick bay, and the number of bunks which can be installed is usually determined not by its cubic capacity but its shape, and, as the allotted space is frequently irregular in outline, the space per bed is ample, owing to the height of the deck overhead.

When beds or bunks are arranged in groups it is best to arrange the patients head to foot, and the same applies to the troops in the standees.

TROOP SPACES.

I can not conclude this article without describing what may be considered the principal portion of a troopship, and that is one of the troop compartments. I think I have described everything else, and now will do my best to give a description of a compartment of which more than 2,000,000 men will retain a vivid memory as long as they live. When a ship was selected as a transport she was surveyed and her troop-carrying capacity determined, so far as possible, and the plans drawn. Workmen then swarmed on board and the work began, and in a short time the 'tween-decks were cleared and large compartments as free from obstructions as possible were left. These were designed to carry the rank and file and their equipment. Seventy cubic feet per man was the calculated allowance, and this allowance contained the soldier and his pack and rifle. The latter were stowed in racks at the foot of the standees, while the pack shared his couch and furnished his bed.

A description of the standees is in order. Several varieties were in vogue during the war, but the type which gave the most satisfaction was the wire-bottomed, pipe-framed one. The first variety was of wood with a wooden-slatted bottom and was arranged as all subsequent varieties were, two to five tiers in height. This was a fine vermin carrier and soon gave way to the next variety, where the uprights were of steel pipe about $1\frac{1}{2}$ inches in diameter, with side rails of the same kind of pipe and with canvas bottoms which could be scrubbed. This was a great improvement over any wooden standee, but the canvas shrunk, had to be scrubbed, and there were two uprights for each standee at each end, and these made cleaning of the compartment harder than was necessary and also difficult to quickly evacuate. The last type in use is the kind now installed on the transports still in service. There is a single upright at either end, and the woven-wire bottoms are in a pipe frame which is attached to the uprights by means of hooks and suspended at the free edge by chains. This standee bunk, which can be triced up

when not in use, and allowing access for cleaning and wider passageways, is the best so far devised.

The dimensions of these bunks or standees are as follows: Length, 80 inches; width, $25\frac{1}{2}$ inches. Space between bunks: Lower, 26 inches; middle, 20 inches; top, 20 inches; width of aisles, 21 inches.

If you can visualize a large compartment with four or five tiers of bunks one above the other, with passageways between that hardly allowed the passage of a man with his equipment, and that swarmed with men, you have a vision of a troop compartment. If the wash rooms and heads were close by, the troop space was a very comfortable one. The police party was always busy, and the amount of rubbish that accumulated was surprising, especially when there was a well-stocked canteen on board, and this was the rule. In describing the heads and wash rooms I forgot to mention that a salt-water supply, independent of that used in the shower or flushing tank of latrine or led from it, should be installed, so that water can be procured for police purposes at the points where most needed. A spigot in a convenient place will suffice and will be greatly appreciated by the police party.

To recapitulate the requirements of the medical department and the other essentials of a troopship:

First. Adequate space to care for 2 per cent of the troops carried, with 1 per cent extra for isolation space, the latter to be divided into at least two units.

Second. This space to be centrally located, easily evacuated, and on an upper deck.

Third. Well-equipped operating room and adnexa, laboratory, dispensary, diet kitchen, and medical storeroom; also large wash room and latrine. Fresh-water showers to sick bay and isolation wards.

Fourth. A space selected and allotted, and necessary wire screens carried, to fit it for the carriage of insane.

Fifth. Steam disinfector of the Kinyoun-Francis type.

Sixth. Utensil sterilizer in isolation ward.

Seventh. A well-equipped dental office.

Eighth. Three medical officers for the first 2,000 troops, then one extra for each 1,000 soldiers embarked.

Ninth. Venereal "head."

Tenth. Facilities for embalming the dead.

REQUIREMENTS FOR A TRANSPORT.

First. Adequate speed and displacement and good design.

Second. Troop compartments easy of access.

Third. Adequate ventilating system.

Fourth. Adequate heating and lighting systems.

Fifth. Sufficient tank capacity to allow at least the minimum water allowance of 5 gallons per person per day.

Sixth. One shower for each 75 men carried (hot and cold).

Seventh. One latrine seat (22 inches of space) for each 30 carried.

Eighth. A minimum of 70 cubic feet of space per man.

Ninth. One washbasin for each 14 men carried.

Tenth. Large cold-storage capacity.

Eleventh. Adequate galley and bakery.

Twelfth. Drying room for the clothes of men coming off watch and a laundry for officers and crew.

Thirteenth. Should be an oil burner.

Fourteenth. Steel-framed, wire-bottomed bunks that can be triced up to allow of free passage between.

Fifteenth. Sanitary scuttle butts, one nozzle per 75 men carried. Spigots also to allow filling of the soldiers' canteens.

Sixteenth. In the spacing of bunks the lower bunk should be at least 6 inches clear of the deck when it is occupied by a soldier with his equipment.

Seventeenth. Adequate copper capacity in galley.

Eighteenth. Proper dish-washing facilities for troops.

Nineteenth. Should the carrying of wounded be contemplated, hammock mattresses sufficient for the allotment of wounded should be carried.

Twentieth. Hospital corpsmen equal to 4 per cent of the sick-bay bunks needed, unless wounded are carried, and then should be increased to $1\frac{1}{2}$ per cent of troops carried, when equipped to carry sick and wounded.

Twenty-first. Garbage receptacles to be freely supplied.

Twenty-second. Life preservers with detachable covers, etc.

EPILOGUE.

My story is ended. The ships which served so well in time of war as troopships have shed their warlike guise and now cross the sea lanes which they once traversed, darkened and ready for the treacherous submarine, as peaceful traders going to the ends of the earth "upon their lawful occasions." I have stated the needs of a transport as my memory serves, setting down nothing in malice or with intent to injure, but with great pride in a service in which I faithfully served. So, when these ships came creeping up the misty harbor in the early morning, laden with their thousands in olive drab or blue, eager to scatter to town or country, it may have been that it was not the harbor that was misty, but my eyes, through seeing so many return while one family circle would wait in vain for the boy who had crossed and the great adventure claimed, and while other families would be welcoming those whom they so often had feared

would never return, this family could only read old, censored letters and wait for a flag-covered coffin.

When Time shall have eased or healed the wounds of war and men can talk about it without bitterness, and the achievements of the various services are weighed and assigned their values, then, I am sure, the transport service will be shown to have played no small part.

One hundred and sixty thousand sick and wounded owe much to the commander of the cruiser and transport force and to the commander of the Newport News division of that force for their thoughtfulness and untiring efforts in their behalf. They felt that these stricken men deserve the best that could be done for them in their hour of pain, and that the least the service could do was to bring them home as comfortably as it could. So, the welfare of these boys, for so most of them were, was ever uppermost in their minds, and any suggestion that could add to their ease and comfort was welcomed.

In the years to come many a man will remember the doctor or hospital corpsman who earnestly did his best to relieve him, or who, passing, tried by cheery word or kind deed to make the day pass in brighter fashion.

The return of two and one-half millions of men from France was a great deed, and the fact that 160,000 of them were maimed or sick took nothing from it.

Now I can only say in conclusion that if these lines of mine in some future time may give a bit of help to a sorely beset medical officer engaged in fitting out the medical department of a troopship I will be amply repaid for the hours spent in composing them.

APPENDIX 1.

INFORMATION BULLETIN No. 43.

MEDICAL.

MAY 22, 1918.

F-1-1.

From: Commander cruiser and transport force.

To: Cruiser and transport force.

Subject: Clinical laboratory facilities on *Leviathan*.

1. The following letter is published for information of medical officers:

7-4-24

U. S. S. "LEVIATHAN," May 21, 1918.
D-1822H.

From: Medical officer.

To: Commanding officer.

Subject: Laboratory facilities on board.

1. You are informed that the medical department of this vessel is now equipped with a fairly complete laboratory in which we are able to make

most bacteriological and chemical examinations required by the average sick bay. Noguchi and Schick tests can be done, and examinations made of blood, water, and milk, etc.

2. It is believed that certain of the transport force not equipped in a similar manner might wish to avail themselves of the benefits of this laboratory, and to that end it is suggested that the commander cruiser force be informed of the facts, Noguchi blood tests will be made on Tuesdays and Fridays of each week.

/s/ H. A. MAY,
ALBERT GLEAVES.

APPENDIX 2.

SANITARY REGULATIONS.

The following sanitary regulations for naval transports were issued and complied with:

1. The sanitary regulations prescribed by United States Navy Regulations and Instructions, the manual for the Medical Department, 1914, and the United States Navy Transport Regulations will be followed.

2. The senior medical officer embarking with troops will make all possible provisions that no case of contagious or active venereal disease boards transports and that the requirements of G. O. No. 20, Headquarters, Port of Embarkation, Hoboken, N. J., 16 October 1917, are complied with.

3. Sanitary inspection will be made twice a day by the Army medical officers, who will inspect the organizations to which they are attached. These inspections will include personnel and equipage in quarters and living spaces devoted to troops.

4. When practicable, weather and other circumstances permitting, the troop spaces will be vacated twice a day for aëration by opening all available ports and hatches. During at least one of the periods of aëration the men will take their blankets on deck for airing.

5. The use of tobacco, either smoking or chewing, will be prohibited at all times in the breathing spaces and during the serving of the food in the mess spaces of the troops.

6. No food will be served outside mess spaces of officers, troops, or crew, except upon the recommendation of the senior medical officer of the ship. No food will be permitted in the troop breathing spaces.

7. The commanding officer will order beds aired whenever conditions permit.

8. Sleeping and lying upon the deck is prohibited.

9. The ships will be sprinkled, swept, and mopped with a disinfecting solution three times a day; with a field day once a week. All swabs used between decks will be thoroughly cleaned and treated with a disinfecting solution three times a day.

10. A sanitary squad under the supervision of a noncommissioned officer will be on duty at all times in each latrine assigned to the troops. Instructions will be issued whom to notify immediately in case of failure of the flushing system of the latrine. All wooden seats to the latrines will be scrubbed daily with lye and treated with steam if practicable. The sanitary squad will also be responsible for the care and cleanliness of the shower baths assigned to the troops.

11. Before disembarkation all troop spaces, including latrines and shower baths assigned to the troops, will be cleaned by them and left in orderly condition.

12. Provisions will be made to inspect ventilators at frequent intervals to see that they are free from obstruction.

13. The sanitary conditions peculiar to each ship will be met by the commanding officer of each ship.

APPENDIX 3.

FORCE ORDER CONFIDENTIAL 01.

1602-6 (9) M.

16 DECEMBER, 1918.

From: Commander cruiser and transport force.

To: Cruiser and transport force.

Subject: Vermin inspection.

(1) In order to prevent the introduction of louse-borne diseases into the United States and to conform to the practice of other services returning troops, the following instructions are published for guidance:

1. A vermin inspection will be made by medical officers of all personnel on board as soon as possible after departure from a European port. The inspection will include a thorough examination of the hair of the head, axillary and pubic region for nits, followed by an examination of the seams of the clothing worn. The vermin inspection will be made by medical officers under the supervision of the senior medical officer in charge.

2. All troops will be directed to examine their clothing daily for lice. A period of 15 minutes will be set aside daily for such an examination. This examination will be under the supervision of a medical officer. All vermin infestation will be reported to him.

3. After a period of six days following embarkation, another vermin inspection of all personnel on board will be made by medical officers.

4. Should a transport carry civilian passengers, the same procedure will be carried out with them as for troops. Female passengers will be instructed to examine their clothing daily and promptly report any vermin infestation to a medical officer.

5. All cases of head lice will be treated by cropping the hair of the head with hair clippers, followed by a bath. Pubic lice will be treated by shaving, followed by a bath. Clothes lice will be treated by cropping the hair of the head, axillary and pubic regions with a hair clipper, followed by a bath. In all instances a bath will consist of washing with warm water and using soap made as follows: Boil 1 part of soap chips in four parts of water and add 2 parts of kerosene oil or 4 parts of gasoline. This jellies when cold. One part of this soap jelly is added to 4 parts of warm water.

6. Where clothes lice or "cooties" are found, all clothing will be sterilized. When transports are provided with sterilizers, all clothing will be sterilized by exposure to steam for 30 minutes, followed by 10 minutes vacuum. When no sterilizers are provided, the clothing will be placed in a "hot box" or dry room at 150° F., and exposed for 80 minutes. In no instance should leather material such as shoes, puttees or hats, rubber, celluloid or money be sterilized. If shrinkage of wool material occurs, the sterilizer is not being properly used. The steam should be superheated and under pressure of 15 pounds per square inch.

7. The medical officer will examine the sleeping quarters each day for vermin, paying particular attention to the cots and blankets.

8. On arrival in the United States, the senior Naval medical officer will furnish in writing to the medical debarkation officer who boards the ship at quarantine:

- (a) The dates that vermin inspections were made of personnel aboard ship.
- (b) Whether daily vermin inspections were made by troops.
- (c) The strength of command by organizations, and number of cases of head lice, body lice, pubic lice found in each organization and description of treatment employed.
- (d) Whether lice were found on examination of cots or blankets.

9. All transports will be disinfected on the return voyage by washing and spraying the sleeping quarters with chlorinated lime or cresol.

10. In order that these orders may be carried out, it is necessary that provisions be made for hair clipping, shaving, and bathing. Also that one or two hot boxes be provided for those transports that have no sterilizers.

ALBERT GLEAVES.

APPENDIX 4.

INFORMATION BULLETIN No. 75.

MISCELLANEOUS.

AUGUST 12, 1918.

S-94-1.

From: Commander cruiser and transport force.

To: Transport force.

Subject: Navy salt-water soap used as a liquid soap. Method of preparing.

1. The following is quoted from a report made by the commanding officer of the U. S. S. *Zeelandia*. It is believed that the information may prove useful in an emergency.

"1. Due to unavoidable circumstances there was not a sufficient supply of liquid soap on board for our first voyage and it was found that a very satisfactory substitute could be made by boiling one bar of Navy salt-water soap in a gallon of water in one of the galley boilers. This mixture remained a liquid when cold and had sufficient body to give satisfactory service. It can be made for 2 cents per pint as against 26 cents per pint for the West Disinfecting Co.'s liquid soap. However, it is not assumed that economy is to be weighed heavily when the few conveniences and comforts that can be afforded the troops are under consideration."

ALBERT GLEAVES.

APPENDIX 5.

U. S. S. "LEVIATHAN."

INSTRUCTIONS FOR ARMY MEDICAL OFFICERS EMBARKED ON THE U. S. S.

"LEVIATHAN."

1. To facilitate the care of the sick of the Army embarked on board the U. S. S. *Leviathan*, the following regulations have been proved by practice to be necessary. Strict attention to the details mentioned will expedite transfer and prevent any loss of property or soldiers' personal effects.

2. When a patient is transferred to the care of the senior medical officer of the transport for hospital treatment, the following-named papers *properly and completely executed must accompany him*:

Form 52 MD.USA (Duplicate).

Diagnosis and transfer slip (one copy).

3. The Army medical officer shall either see that the effects of patients are secured (except accouterment) and sent to the ship's hospital, or have the

same attended to by patient's company commander, but the Army medical officer will not be released from responsibility for the same until notified that effects have been received. Tags, with a list of the patient's effects, will be furnished each dispensary and they will be attached to each man's effects before they are turned over. Each patient's life preserver must be sent to the ship's hospital with him.

4. The company commander will then be notified that the man has been admitted to the ship's hospital and that his service record is to be transferred to the custody of the ship's medical officer for further transfer if necessary to a hospital ashore or return to the company commander should the man be returned to duty with his command.

Except in the case of actual emergency, patients will not be admitted to the ship's hospital until the above instructions have been complied with.

5. The senior Army medical officer shall detail from each organization accompanied by medical officers a medical officer to act as sanitary officer, and the sanitary regulations for transports shall be observed.

6. The senior medical officer present with troops will notify all medical officers attached to each organization that it is their duty to be present at sick call morning and evening, and that sick call will be promptly sounded at the time set, and they will present themselves promptly at the dispensary to which they are assigned.

7. There will be a medical officer of the day for each organization, who will promptly answer all sick calls, and he shall leave his name and room number in the dispensary at which his organization reports.

8. Members of the Army Hospital Corps shall be detailed to each dispensary for assistants. A litter is kept at each dispensary, and whenever a soldier is sick in his bunk and unable to walk he will be brought to the sick bay for examination. Only in case of accident requiring first aid will an Army medical officer be required to visit the troop decks. In case of illness the man must be removed anyhow for diagnosis and treatment, and time is lost by failure to have him promptly carried to the nearest dispensary.

9. A member of the Army Hospital Corps familiar with the Army forms will be detailed by the senior Army medical officer to the surgeon's office in the hospital on "B" deck.

10. To avoid misunderstandings, it should be distinctly understood that all medicines will be furnished by the Navy, and prescriptions will be filled by members of the Navy Hospital Corps.

11. The senior medical officer of each separate organization shall submit to the senior medical officer as soon as possible after arrival on board a complete roster of his organization, e. g., medical officers, members of the Army Hospital Corps, and the personnel of base hospitals, the Female Nurse Corps, and civilians.

12. The Army medical officer assigned as sanitary officer shall immediately upon embarking appoint subordinates to superintend the sanitation of latrines, urinals, and the swabbing down of their several decks. These assistants are to report every morning at 9 o'clock to the ship's sanitary officer. He will supply these men with sufficient disinfectants and deodorizing material for that day.

JOHN J. SNYDER,

Medical Inspector, United States Navy,

Senior Medical Officer.

Approved :

J. W. OMAN,

Captain, United States Navy, Commanding.

NOTES ON PLASTIC SURGERY.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

One whose hobby is plastic surgery will find plenty of exercise for his hobby in the wards of a naval hospital or a hospital ship. There is no longer the abundant supply of extensive face plastic and rhinoplastic work that we enjoyed during the war, but there are many similar cases which may be benefited by plastic procedures which the operator may employ to keep his hands trained and the principles of plastic surgery fresh in his mind.

The Reverdin graft, pinch graft, or small deep graft is useful in a great variety of cases where it is desired to epithelialize a surface and avoid scar tissue formation. Skin grafting is logically the closing chapter in the treatment of most third-degree burns. It should be done as early as there is a clean granulating surface and, except on the hands and face, where it is not suitable for cosmetic reasons, the Reverdin graft is the easiest and the most certain to be successful. The technic consists in lifting a small portion of skin on the point of a needle, removing it with knife or scissors and placing it, with many like it, on the raw area. The individual graft is about the diameter of a lead pencil, thick in the middle and thin at the edges. Epithelium grows rapidly from each little graft and the intervening raw surface is rapidly covered. We are accustomed to use paraffin net as a dressing after skin grafting, as it permits inspection of the graft and escape of the secretions. Infection of the points from which the grafts are removed may be avoided by passing the needle through the flame of an alcohol lamp after each of the grafts is placed.

The following cases illustrate a few of the many uses of the Reverdin graft:

Case 204. Compound fracture of both bones of the leg with much destruction of the soft tissues. Six months later a large indolent ulcer remained at the site of the injury.

To the raw area 60 grafts were applied, taken from the front of the thigh. All the grafts lived and healing was rapid.

Case 347. This man's leg was caught in a chain, producing a circular crush of the soft tissue. Three months later there remained an indolent ulcer 7 by 3 inches.

The anterior part of the ulcer was covered with 39 grafts taken from the front of the thigh. All lived. Three weeks later 47 more were applied to the posterior part. All grafts lived and healing was rapid. Figure 1 shows the area from which the grafts were taken and the two stages of healing of the ulcer.

Case 441. A large carbuncle on the back of the neck was excised and curetted. After the surface was clean and granulating it was



FIG. 2.—CASE 373. FLAP FROM THIGH TO END OF STUMP.

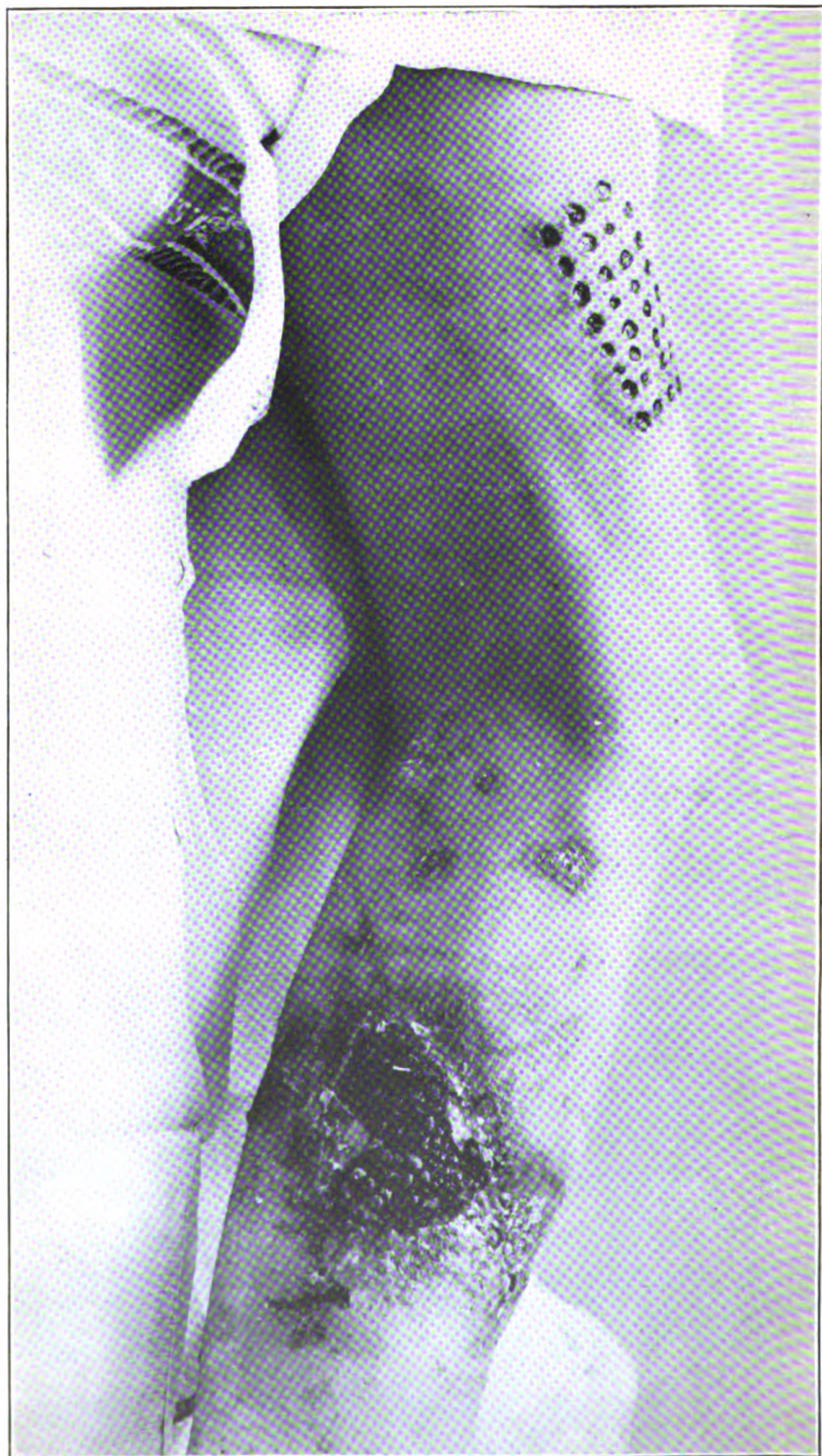


FIG. 1.—CASE 347. REVERDIN GRAFTS FROM THIGH APPLIED TO ULCER OF LEG.

covered with grafts taken from the skin over the deltoid. Healing was rapid.

Case 390. A third-degree burn of the back and shoulder, leaving a thick band of scar tissue with an ulcer in its center. This caused serious interference with the use of the arm. To the ulcer 20 grafts were applied. All lived. After the ulcer was completely healed the scar tissue was removed and by transposition of flaps the tension was relieved and the full range of motion of the shoulder restored.

Case 634. An extensive burn of the arm, resulting in a thick scar extending from the upper third of the arm to the middle of the forearm, adherent to the bone, limiting motion of the elbow and causing constant pain.

The thick cicatricial band, 10 by 3 inches, was excised; the skin edges were undercut and approximated with tension sutures. A mass of fat was taken from the abdominal wall and inserted under the skin to protect the internal condyle and ulnar nerve. The tension on the sutures proved too great and the skin edges retracted, leaving a raw surface about 1 inch wide. When this was covered with granulations 64 grafts taken from the thigh were applied. All but 1 of these lived and the raw surface was rapidly covered with new skin.

When a raw area remains which can not be covered by stretching the skin, Esser's method is useful. Soften a piece of dental modeling compound in hot water and press it firmly over the raw place. Harden it in cold water. Cut Theirsch grafts and place them on the modeling compound with the raw surface out, securing them by sutures passed around the modeling compound. Apply this to the raw area and bind it firmly in place. This serves to hold the graft in place with uniform pressure until healing occurs.

The Wolf graft or full-thickness graft has a more limited field of usefulness. This method consists in cutting a piece of skin of the full thickness and placing it in the defect after all scar tissue has been removed. The probability of life of the graft is much less than when Reverdin's method is used. It was formerly taught that the graft should be cut one-sixth to one-third larger than the area to be covered because of the contraction of the skin after cutting. Now it is generally recognized that the chances of success are greater if the graft is cut exactly the size of the defect and not allowed to contract, because, in contracting, the lymph channels close and do not permit reestablishment of circulation as well as if the normal tension is maintained. The chances of success are greater if the grafting is done on an area which has a very rich blood supply, such as the face. In cutting the graft it is well to use a

pattern made of sterile lead foil or heavy tin foil, cut exactly to the size of the area to be grafted.

The following two cases illustrate the use of the Wolf graft:

Case 331. An old shrapnel wound involving the tendon Achilles. A dense, adherent scar with an ulcer in the center.

The scar was excised and a lead foil pattern cut. A full-thickness graft was cut from the abdomen and sutured over the raw area. The abdominal wound was closed by undercutting and stretching the adjacent skin. The operation was only partly successful because of the poor blood supply to the area. A secondary operation was necessary.

Case 373. Admitted after an amputation 4 inches below the right knee, in a civil hospital. There was an indolent ulcer, 2 inches in diameter, on the end of the stump. Because of the short stump it was impossible to amputate higher, for longer skin flaps, and still retain a useful knee joint.

A flap with a wide pedicle was cut on the inner side of the left thigh and sutured to the site of the ulcer after all scar tissue had been removed. In order to avoid a raw surface in a place where it could not be conveniently dressed, a Wolf graft was cut from the front of the left thigh and sutured over the area from which the flap was raised. The area from which the Wolf graft was taken was cleaned by undercutting and stretching the adjacent skin. The Wolf graft lived but the flap was not entirely successful, mainly because of the difficulty of controlling the short stump. It would have been better to prepare, in advance of the operation, a plaster cast to hold the stump firmly in position. Figure 2 shows the position of the stump and the flap, also the place from which the Wolf graft was taken. The tension sutures are threaded through bone buttons to prevent cutting the skin.

Frequently men will come to the surgeon requesting operation for removal of scars or correction of facial disfigurements. Such operations are often of value by increasing the man's self-respect, for any such defect quickly makes him the butt of ridicule by his fellows on board ship. Before undertaking such work the patient should be made to understand distinctly that improvement is by no means certain and there is always the possibility that the condition after operation may be worse than before. The first two cases described below are good examples of this fact.

Certain principles of scar excision are important. All scar tissue must be removed. Fat or muscle should be approximated by fine gut suture to prevent hollows or adhesion of the skin to the bone. The skin should be undercut around the incision so that the skin edges may be brought together without great tension. If tension is unavoidable, it should be distributed by tension sutures placed at

a distance from the skin edges and threaded over bone buttons, rubber tubes, or rolls of gauze, to prevent cutting through the skin. The skin edges should never be grasped in forceps; it is better to grasp the under surface of the skin. Sutures should be closely placed, using fine material, such as horsehair. They should be removed early, usually on the fourth day. If left longer than this, the epithelium begins to grow down along the track of the suture, leaving a permanent mark. The intracuticular suture is not so good on the face as a simpler interrupted or continuous suture which gives more accurate apposition of the edges. A coating of compound tincture of benzoin will usually be sufficient dressing. Local anesthesia is generally used for this work, apothesine or novocaine. If general anesthesia is necessary for a face plastic, it is well to give it intratracheally or by rectum.

The principal complications to be feared are hemorrhage, sepsis, and keloid. The coagulation time should be taken so that there is no danger of working on a hemophiliac. When other scars on a patient's body show evidence of keloid formation, X-ray or radium treatment should be started soon after the operation in order to avoid this complication. Sepsis is to be avoided by careful technic and postoperative care. We usually wash the skin with ether and use no other preparation before a face operation. If infection occurs under a flap, a single stitch may be cut, a very fine rubber tube inserted under the flap, and Dakin's solution instilled every two hours. It will usually be possible to remove the tube within two days, put in another stitch, and secure healing without any additional scar formation.

Some cases illustrating this work are briefly described.

Case 48. A scar on the right cheek, adherent to the alveolus, the result of an abscess of an upper bicuspid.

With local anesthesia the scar was excised, the fat was turned in and sutured, and the skin closed with horsehair sutures. It was difficult to control the bleeding. On the sixth day the sutures were removed. The wound bled freely from the stitch holes. On questioning, he gave a typical history of hemophilia. Bleeding continued over a month in spite of styptics, coagulants, and all other treatments that were used. The end result was a large stellate scar, much worse than the original one.

Case 436. Injured by explosion of a rifle while on the target range, which caused a laceration of the right cheek and eye. The result was a large, irregular keloidal scar extending from the outer canthus to the nostril. The lower eyelid was distorted and the socket nearly obliterated, so that an artificial eye could not be retained.

The scar was removed, the cheek and eyelid were restored, and a second operation was planned to prepare the socket for an artificial

eye. X-ray treatment was begun at once to prevent recurrence of the keloid. Figure 3 shows the condition before operation. The scar rapidly developed into a large keloid and there was no improvement from the operation.

These two cases illustrate the uncertainty of plastic work and the importance of having the patient understand, before the operation, that success, or even improvement, is by no means certain.

Case 128. Gunshot wound of the right arm, resulting in a scar 8 by $1\frac{1}{2}$ inches on the inner side of the elbow, adherent to the bone and causing much pain along the ulnar nerve. A similar scar on the outer side of the arm.

The scar on the inner side of the arm was removed, muscle and fat were folded in to cover the bone and the nerve. The skin was undercut and closed with tension sutures. Six weeks later the scar on the outer side of the arm was removed in a similar manner. The full range of motion was restored to the elbow and the pain was relieved.

Case 334. A young girl, shot in the right temple by a .45 revolver held close to the head. The bullet penetrated the skull, tearing the roof of the orbit, destroying the eye and entering the frontal lobe of the brain. There was a stellate laceration with a severe burn.

All the loose fragments of bone were removed and the eye enucleated. The skin edges were approximated in part of the wound. The bullet was removed through a separate incision. Later, a face plastic was done to correct the scar and prepare a socket to hold the artificial eye. The result was an almost invisible scar and a natural-looking eye. The patient has recently married.

Case 437. Cut with a machete over the right eye, breaking in the wall of the frontal sinus, leaving a depressed scar 2 inches long and adherent to the bone. See Figure 4.

The scar was excised and the bone edges cleared. The mucosa of the frontal sinus was cleared from the scar and sutured. A mass of fat was taken from the abdomen and placed in the hollow of the bone. The skin edges were undercut and approximated. The result was an almost invisible scar. See Figure 5.

Case 122. Burned in a coal gas explosion. Heavy keloidal scars of face and hands, ectropion of lids of both eyes, and chronic conjunctivitis. He was very despondent over his disfigurement and had not visited his home since being injured. Figure 6 shows the thick scar of the face and the loss of tissue of the nose and ear. Figure 7 shows the heavy scar on the chin and the inability to close the eyes because of the ectropion.

The eyelids were repaired by Gillies' modification of Esser's method (Naval Medical Bulletin, vol. 14, No. 1, January, 1920, p. 16), which allowed the eyelids to close properly and relieved the



FIG. 3.—CASE 436. KELOID OF CHEEK.

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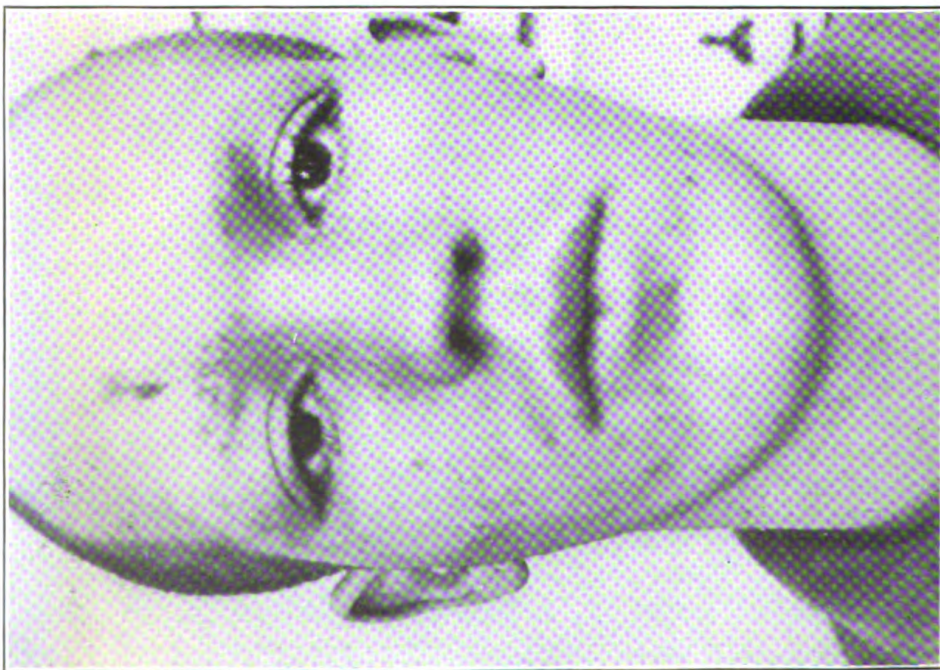


FIG. 4.—CASE 437. DEPRESSED SCAR OF FRONTAL REGION BEFORE OPERATION.



FIG. 5.—CASE 437. AFTER OPERATION.



FIG. 6.—CASE 122. KELOID FOLLOWING SEVERE BURN.



FIG. 7.—CASE 122. KELOID AND ECTROPION, EYES CLOSED. NOTE HEAVY SCAR ON CHIN AND INABILITY TO CLOSE EYES COMPLETELY BECAUSE OF THE ECTROPION.

chronic conjunctivitis. The scars on the chin were removed, flaps were cut and advanced to cover the space. Nine operations were done on his face and he was then so far improved in appearance and in spirits that he went home on leave and married the girl.

Epithelial growths of doubtful malignancy are not uncommon among the older men of the service. Only one method of handling these is safe and that is early and wide excision of the growth. Some typical cases of this sort are here described.

Case 15. Age 51. Epidermoid carcinoma on the lower lid of the left eye and one 4 centimeters in diameter on the side of the neck. No glandular involvement. Under local anesthesia both growths were excised. No enlarged glands were found. The subcuticular fat was sutured, the skin undercut and approximated with tension sutures. Healing was uneventful and there has been no recurrence after two years and nine months.

Case 28. Age 50. Epidermoid carcinoma on lower lip. He never smokes. He has had syphilis, but vigorous treatment has made no change in the growth. No glandular involvement.

The growth was removed by a wide V-shaped resection. The wound was closed with careful apposition of the mucocutaneous line. If this is not accurately done, the scar will be very conspicuous. There has been no recurrence after two years and eight months.

THE CLINICAL VALUE OF BLOOD CHEMISTRY IN CHRONIC NEPHRITIS.

By J. J. O'MALLEY, Lieutenant Commander, Medical Corps, United States Navy.

For many years the estimation of the quantities of the different chemical constituents of the blood had only a scientific value, but during the past few years many investigations of the different proportions of these chemical substances in the blood in the different diseases of the kidneys has placed such knowledge on a high plane of practical value. No case of kidney disease can be properly studied without knowing what damage has occurred to the function of these organs, and this can be only appreciated by knowing the quantities of the different substances that should have been excreted but because of the disturbances in the function of the kidneys are held back in the blood stream.

Formerly dependence was placed entirely upon the chemical examination of the urine for an appreciation of the kidney function, but this required a definite knowledge of the amount of solids taken by the patient, which was seldom known; and the quantities of the different nitrogenous products excreted in the urine gives no absolute knowledge of the amount the patient is retaining in his sys-

tem. What we are particularly interested in, in the individual patient, is not how much of the products of metabolism he is excreting, but how much is he retaining, and this is obtained only by a chemical analysis of the blood.

To-day diseases of the kidneys are studied from the standpoint of retention of metabolic products in the blood, and the excretion of these products in the urine has only a secondary value. This can be better realized where it is appreciated that when the kidneys are diseased and their function disturbed, other normal avenues of excretion, as the bowels, lungs, and skin, increase their elimination, and methods of estimating the amount of this excretion are not satisfactory and are too complicated to be of practical value. Even if you have determined the urinary values of excretion the figures will not indicate the amount excreted by these other avenues and there is no way to approximate this additional value in figures that will give you an idea of the patient's total excretion. An examination of the chemistry of the blood gives values that bear directly on the patient's condition and you know immediately if products deleterious to the body are being retained in the blood stream.

The constituents of the blood that interest us most are the non-protein nitrogen, which is normally present in quantities of 25 to 30 mg. per 100 c. c. of whole blood; sugar (90 to 120 mg. per 100 c. c.); and plasma CO_2 , which is present in 80 to 55 volumes per cent. The nonprotein nitrogen consists of urea nitrogen (10–15 mg.), uric acid (2 to 3 mg.), creatinine (1 to 2 mg.), creatine (3 to 5 mg.), amino acids (6 to 8 mg.), and ammonia (0.1 mg.). Of these the urea nitrogen, creatinine, and uric acid are the important ones. These quantities are the accepted normals, but it must not be presumed that the blood maintains an absolute balance between these figures, as increased protein or sugar ingestion or increased tissue catabolism may increase the quantities in the blood considerably; this, however, is only temporary in the normal person, as the kidneys will promptly increase their activity and excrete larger amounts.

In disease, however, the kidneys lose more or less of their property of excretion, and these substances are retained in the blood. It is generally accepted that uræmia is the result of an excess of nitrogenous products, particularly urea, in the blood, and, with a few exceptions, if a patient's blood is studied regularly throughout the disease, the occurrence of uræmia can be anticipated. While the figures are not absolute, still when the quantity of urea nitrogen is about 60 mg. the patient should develop uræmia. The few exceptions are some peculiar cases of chronic nephritis with edema and also some cases of complete anuria where the blood findings will remain normal up to the termination of the disease, and the very exceptional cases of nephritis where the nitrogenous products are

considerably above the uræmic quantities with no clinical signs of uræmia.

These cases are the exceptions to the rule and need simply to be kept in mind when placing a practical value on the blood readings.

Regular examinations of the blood have a great value in determining the success of treatment, rising quantities indicating that the treatment is inefficient and that more drastic measures must be instituted. Also rising values in the presence of the best-known measures of treatment would indicate a bad prognosis.

The concentration of creatinine is very interesting, as this product is essentially endogenous in origin and is the easiest one of all the non-protein nitrogen substances for the kidneys to excrete. When the quantity in the blood rises to about 4 mg. per 100 c. c. it indicates marked interference with the kidney function, and when on repeated examinations it is found to remain about 5 mg. or more the prognosis is bad and death occurs in a few months.

The plasma CO_2 content is of very great value in distinguishing acidosis from uræmia. In acidosis the values should be well below 53, which is the low limit of normal.

The following brief history of a patient with chronic interstitial nephritis is given with the blood readings to illustrate the value and importance of the chemistry of the blood in diseases of the kidney:

The patient is 34 years of age, married, and is the father of two healthy children. No miscarriages. Excellent family history. Past history negative for any diseases that might produce complications of the kidneys. Has always been very healthy and active. No venereal history.

For the past 10 years has been engaged as a typesetter in a newspaper office and has been in close contact with lead type during this period.

About one year ago he developed headaches, with "pounding sensations" in his head, increased nervousness, constipation, and pallor. Frequency of urination and increase in quantity noted. No edema at any time.

He suddenly passed into an uræmic state which was successfully treated, and he later returned to his work. A second attack followed in a few weeks' time, and he states that it was more severe and prolonged than the first; by energetic treatment he recovered from it.

He came under observation at this time and physical examination showed a well-developed man with marked pallor and limitation of activity from the previous uræmic attacks. He was able to go around, but complained of periodic and severe headaches. Eye grounds showed an albuminuric retinitis, pupils reacted normally; lungs were normal; heart showed a slight enlargement to the left,

heart sounds were clear and distinct, but the second aortic was very loud and snappy; liver and spleen normal in size, and no abnormalities noted about the abdomen; all reflexes were present and slightly hyperactive.

All the superficial blood vessels were markedly sclerosed, the radials being beaded. Blood pressure 220-110, and equal on both sides.

Urinalysis.—Day specimen, 8 a. m. to 8 p. m. Quantity: 1,500 mils. Specific gravity: 1009. Albumin: Pos. (0.1 per cent). Sugar: Negative. Microscopical: Few small granular casts. Night specimen, 8 p. m. to 8 a. m. Quantity: 1,700 mils. Specific gravity: 1009. Albumin: Pos. (0.08 per cent). Sugar: Negative. Microscopical: Few small granular casts.

Kidney function test.—Phenolsulphonephthalein: Excretion first hour, 10 per cent; excretion second hour, 5 per cent; total excretion, 15 per cent. Normal excretion is 40 to 60 per cent.

Blood chemistry.—Nonprotein nitrogen, 54.8 mg. in 100 c. c.: normal, 25-30 mg. Urea nitrogen, 33 mg. in 100 c. c.; normal, 10-15 mg. Uric acid, 3.3 mg. in 100 c. c.; normal 2-3 mg. Creatinine, 2.7 mg. in 100 c. c.; normal 1-2 mg. Sugar, 140 mg. in 100 c. c.; normal, 90-120 mg. Plasma CO₂, 54 volumes per cent; normal, 80-53 volumes per cent.

With the above findings a diagnosis of arteriosclerosis with hypertension, chronic interstitial nephritis, and myocarditis was made, the condition resulting from the continual absorption of lead.

The nonprotein nitrogen and the urea nitrogen are found to be increased 100 per cent above normal, while the uric acid and creatinine are slightly increased; the sugar is normal and the plasma CO₂ is around the low limit of normal. Immediately it is noted that the condition is one of marked nitrogen retention, and drastic measures of treatment are demanded.

He was directed to spend 20 hours at rest in bed each day, with 4 hours up riding in an automobile to avoid the depression of being a complete invalid. A dietary of 2,500 calories was arranged, consisting of milk and carbohydrates, and since the kidneys were excreting liquids liberally they were given in a quantity of 3,000 c.c. in the 24 hours. To insure liberal elimination, an ounce of magnesium sulphate with hot packs to produce sweating were given on alternate days.

Under this régime he appeared to improve clinically; he certainly grew stronger, was entirely relieved of headaches, and the blood pressure came down to 190-105, compared with 220-110 before treatment. This was entirely due to the long hours of rest and mental satisfaction over what appeared to be an improvement in his condition.

Two weeks later another analysis of the blood chemistry showed the improvement to be apparent only, as the retention of nitrogenous products was increasing and his condition steadily grew worse.

Nonprotein nitrogen, 65 mg. in 100 c. c.; normal, 25–30 mg. Urea nitrogen, 46 mg. in 100 c. c.; normal 10–15 mg. Uric Acid, 3.3 mg. in 100 c. c.; normal, 2–3 mg. Creatinine, 2.5 mg. in 100 c. c.; normal, 1–2 mg. Sugar, 107 mg. in 100 c. c.; normal, 90–120 mg. Plasma CO₂, 63 volumes per cent; normal, 80–53 volumes per cent.

Compared with the previous analysis it is noted that the nonprotein nitrogen increased 11 mg. and the urea nitrogen 13 mg., both rising up to values that indicated danger and offered a bad prognosis. The other substances remained about the same levels, the sugar content being slightly lower regardless of the excessive amount of carbohydrates in the diet. Advantage was taken of his ability to assimilate carbohydrates to increase them in the dietary and reduce the quantity of milk which was supplying the most proteids. Starchy foods were selected that showed the least amount of proteids and the diet maintained at 2,500 calories. Fluids were increased to 4,000 c. c. and he was given hot packs daily.

He continued to feel comfortable and showed no mental disturbance under the energetic treatment. His kidneys continued to excrete fluids liberally, about 75 per cent of his intake with allowances for the amount excreted by the skin in the daily sweatings. The specific gravity was always low, around 1008, and remained fixed about these figures in all specimens. There was no edema at any time.

The third blood analysis taken two weeks after the preceding one showed: Nonprotein nitrogen, 84 mg. in 100 c. c.; normal, 25–30 mg. Urea nitrogen, 60 mg. in 100 c. c.; normal, 10–15 mg. Uric acid 5.3 mg. in 100 c. c.; normal, 2–3 mg. Creatinine, 3.5 mg. in 100 c. c.; normal, 1–2 mg. Sugar, 150 mg. in 100 c. c.; normal, 90–120 mg. Plasma CO₂, 55.9 volumes per cent; normal, 80–53 volumes per cent.

Compared with the preceding analysis all the nonprotein nitrogenous substances show a marked increase; the nonprotein nitrogen and urea nitrogen in such high values showed that uræmia was imminent. The creatinine had reached a level indicating marked impairment of function, the increase in sugar indicating the excess of carbohydrates in the diet.

His condition was also growing worse, and a few days later he passed into a definite uræmic state which lasted three days and he died from uræmia combined with cardiac dilatation.

The day before death the blood chemistry showed: Nonprotein nitrogen, 100 mg. in 100 c. c.; normal 25–30 mg. Urea nitrogen, 85 mg. in 100 c. c.; normal 10–15 mg. Uric acid, 7.5 mg. in 100 c. c.;

normal, 2-3 mg. Creatinine, 5 mg. in 100 c. c.; normal, 1-2 mg. Sugar, 150 mg. in 100 c. c.; normal, 90-120 mg. Plasma CO₂, 55.9 volumes per cent; normal 80-53 volumes per cent.

CORRECTION OF OCCLUSAL STRESS ON INLAY PATTERNS WITHOUT DISTORTION.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

The indirect method of making wax patterns for inlays has won many adherents, due perhaps to the fact that the carving can be done much more easily in the laboratory on the model of the tooth prepared for that purpose than in the mouth, as is necessary in the direct method. The former method, however, would seem open to the objection which attends any procedure whose aim is to produce work of an exact nature as the end result of several operations, a slight deviation in any one of which would prevent an accurate result in the finished product. Thus to summarize the indirect method, it involves absolute exactness in each of the following procedures—obtaining a modeling compound impression, making of a die, fitting and carving a pattern on the die, and in many cases a final swaging of the casting to the die before insertion. If a perfect inlay is obtained, as far as adaptation, particularly gingival is concerned, all is well, but this is often not the case. The statement has been made that it is physically impossible to produce an exact replica of a cavity.

The so-called direct indirect method advocated by some differs in that after the wax pattern has been prepared on the die it is returned to the cavity, given final marginal adaptation, removed, cast, and placed in the mouth without returning to the die. This method, as well as the direct, presents, in the opinion of the writer, a chance for error or distortion of the pattern when the attempt is made to get the occlusion of the opposing teeth with the pattern in place. If the patient is told to close the teeth lightly together, correct occlusion can not be obtained; conversely, if told to close firmly and triturate, control of the force exerted is not possible and, unless conditions are extremely favorable, the chances are that the pattern will be distorted, even though this may not be apparent at the time, but found subsequently as a sad discovery that the casting does not have perfect adaptation. If in the first place the wax is sufficiently softened to permit of having the opposing teeth bite into the surface of the pattern when it is in the cavity, the wax is soft enough to flow or be pushed bodily from its correct seating, while, on the other hand, if the wax be hard enough to retain its seat while occlusal force is being applied on its comparatively unyielding surface, it may result in a

springing of the entire mass. This spring or flare of some portions of the pattern may not be of sufficient degree to be discernible at the time.

To permit of the carving of an approximately correct occlusal relation, with the wax in the cavity, and at the same time prevent the possibility of distortion of the pattern, the following suggestion is offered:

The pattern is placed in position in the cavity and it, as well as the opposing teeth, are dried, a thin paste of zinc oxide and water, or any suitable material, is spread evenly over the occluding surfaces of the opposing teeth and the patient is instructed to close the teeth so that only the merest contact is obtained. Upon opening the mouth distinct markings upon the wax will indicate the areas to be relieved. These are relieved by carving and the operation is repeated until an evenly distributed marking is noted. When this is apparent, sulci, cusps, ridges, etc., are finished to suit the case. The entire operation is performed without at any time bringing undue stress on the pattern and consequently obviating the possibility of distortion from this common cause.

Carving wax is much more satisfactory and requires so much less expenditure of time and energy than the grinding of gold. It is a tedious process, as most will agree, to attempt to reduce the proper occlusion inlays which have been cast with supra occlusion, as it means not only the removing of the excess gold with stones and burs, but often necessitates deepening of sulci, etc., to conform with the reliefs.

The method above advanced has also been found of particular value in the carving of the occlusal surfaces of amalgam fillings while the material is soft enough to be carved without effort, and it obviates the likelihood of fracturing or crushing fillings of this material, as occasionally happens when the patient is directed to close to obtain a mark of the contacts with carbon paper, or by simple abrasion. Incidentally, it will render rare the occasions when supra or excessive occlusion is found to exist after fillings have set.

EDITORIAL.

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ON VOMITING IN ACUTE ABDOMINAL LESIONS.

Vomiting is observed in the early stages of many diseases and is usually of little help in diagnosis. When present as one of the symptoms of an acute abdominal lesion, however, it may be of great diagnostic value. We must consider the time of onset of the vomiting, its duration, the character of the vomitus, and the manner of its ejection.

It is produced by stimulation of the vomiting center in the medulla. There is first a deep inspiration; the glottis closes; the diaphragm and abdominal muscles contract; the cardiac sphincter of the stomach relaxes, and the contents of the stomach are expelled. If the stomach is empty, retching occurs and is even more distressing. The center may be stimulated directly by poisons circulating in the blood, such as apomorphine, alcohol, chloroform, ether, or toxic metabolic products. It may also be stimulated by peripheral irritation in the areas supplied by the pneumogastric nerve. Direct irritation of the fibers in the gastric wall is the most common source. It may arise from structural damage, such as cancer, ulcer, or gastritis, or from irritation from emetic drugs or irritating stomach contents.

Lesions outside the abdomen may have vomiting as a symptom and simulate acute abdominal lesions. In uræmia uncontrollable vomiting may be the initial symptom. Tumors, abscesses or injuries of the brain may cause vomiting by centric stimulation. This type of vomiting occurs without nausea and independent of taking food, often without warning and without effort. It is projectile, the stomach contents being expelled with great force. There is no retching and the tongue remains clean though the vomiting may persist and be very obstinate.

Postoperative vomiting may be due to the anesthetic, to acute gastric dilatation, ileus, peritonitis, or uræmia. If due to the anesthetic, it usually begins before the patient regains consciousness.

If persistent, uræmia should be suspected. Acute gastric dilatation is characterized by persistent, painless vomiting of great quantities of brownish, sour liquid.

Abdominal injuries frequently have vomiting as a symptom. If it persists for several hours, an injury to the stomach or small intestine is probable. If the vomitus contains much bright blood, look for an injury to the stomach. If there is much bile, appearing early, look for an injury to the small intestine.

Acute gastroenteritis must usually be considered in the diagnosis of an acute abdominal lesion. Here the vomiting is early and the vomitus consists first of stomach contents, later of bile-stained mucus. It may be repeated but not so persistently as in intestinal obstruction. The vomitus is never fecal, nor does it contain great quantities of bile. The abdominal discomfort is relieved by the vomiting.

Gastric ulcer is accompanied by vomiting in about two-thirds of the cases, while in duodenal ulcer it is much less common. It usually occurs at the height of digestion and relieves, for a time, the gastric distress. The vomitus is highly acid and shows rapid digestion. Vomiting as soon as food reaches the stomach has been noted in several cases where the ulcer was opposite the entrance of the esophagus. After rupture of a peptic ulcer vomiting occurs in about one-third of the cases. The usual sequence is pain, rigidity, vomiting. The last is not so prominent a symptom as the other two during the first 24 hours, but if the condition is allowed to persist it becomes more marked as a symptom of peritonitis. Blood may or may not be present in the vomitus, but, if present, is of diagnostic significance.

Intestinal obstruction is accompanied by vomiting so frequently repeated that nothing is retained. It is continuous and increasing in severity, constant and distressing. It gives no relief from the abdominal distress. The vomitus is first gastric contents, then bilious, then fecal. This sequence is a very important diagnostic feature. Fecal vomiting does not appear before the third day and so will not be seen if the case is diagnosed and relieved in an earlier stage. Obstruction high up in the intestinal tract produces earlier and more severe vomiting than lesions lower down. In strangulation, vomiting is early and severe. In volvulus it usually appears late. In intussusception it comes early, with, or just after, the initial paroxysm of pain. It may be persistent, especially if the small intestine is involved.

In appendicitis the vomiting comes on soon after the initial pain. If it precedes the pain, it is probably not appendicitis. It may occur once or twice in the first 24 hours, but is not frequently repeated un-

less peritonitis begins. The vomitus is stomach contents and mucus mixed with bile.

Cholecystitis, whether infectious or calculous, has vomiting as an early symptom, frequently preceding the pain. It recurs during the attack, but if it persists long after the stomach is empty it indicates that the inflammation has gone beyond the gall bladder—pericholecystitis or peritonitis. The vomitus is first stomach contents, then mucus, then bile.

Acute pancreatitis is accompanied by vomiting which comes on soon after the first paroxysm of pain and is so persistent that, together with the obstinate constipation, it may lead to the mistaken diagnosis of intestinal obstruction. The vomitus in acute pancreatitis does not tend to become fecal.

In renal colic, vomiting is present in severe cases, following paroxysms of pain, but it is not usually a prominent symptom.

(L. W. J.)

THE NEW TREATMENT OF DIABETES BY INSULIN.

The medical world is watching with great interest the development of the new treatment of diabetes by insulin, a substance extracted from the pancreas of the ox, pig, or sheep. It was Lépine who first suggested that the condition of diabetes which Von Mering and Minkowski had discovered to follow pancreatectomy might be due to the withdrawal of an internal secretion necessary in the normal animal for the complete metabolism of sugar. Since his day many investigators have made attempts to obtain direct proof of the existence of this hormone. Among the most striking of the investigations may be mentioned those of Clarke, who discovered that the isolated mammalian heart—kept alive by perfusing its blood vessels with Locke's solution containing glucose—removes sugar from the perfusion fluid much more rapidly when the fluid used had first of all been perfused through the blood vessels of the pancreas than from fresh Locke's solution. From this fact it was concluded that a pancreatic hormone must exist, but that it was impossible to detect its presence in pancreatic extracts because of its destruction by the trypsin and other proteolytic enzymes also present in them.

The problem of isolating this hormone involved the circumvention of these enzymes. This was first accomplished by Banting, of the University of Toronto, who took advantage of the fact that the cells which secrete the digestive enzymes become completely degenerated after ligation of the pancreatic ducts, whereas those of the islands of Langerhans, which appear to secrete the antidiabetic hormone, remain more or less intact. Banting's observations on the effects of

the extracts of the degenerated gland injected into dogs, rendered diabetic by extirpation of the pancreas, showed a lowering of the percentage of sugar in the blood as well as in the total sugar excretion in the urine and an improvement in the subjective condition of the animal with a prolongation of its life.

Having shown that the pancreas does contain an antidiabetic hormone, Banting's next problem was to find a method by which it could be extracted from the undegenerated gland. By using alcohol as the extracting medium, so as to circumvent the destructive action of trypsin, satisfactory results were obtained. With the extract so prepared, Banting and his coworkers in the University of Toronto treated a boy of 14 years suffering from the usual severe type of the disease that is common at this age and found that the percentage of blood sugar could be enormously reduced.

To the internal secretion of the pancreas which Banting was able to extract, the name insulin was given.

Improvements in the method of extracting insulin, its preparation on a large scale, and tests of the potency of the batches produced have been perfected in Toronto to a certain degree.

In attempting to make a pharmacological assay of the new product it was found that insulin lowers the percentage of blood sugar in normal rabbits, and the workers in the University of Toronto have found it satisfactory to consider as one unit the amount of insulin which, on subcutaneous injection, can lower the percentage of blood sugar to 0.045 within four hours in a rabbit weighing 2 kg. from which food has been withheld for 24 hours. The solutions of insulin prepared in Toronto for clinical use contain 1 unit in a cubic centimeter. The reason why 0.045 was chosen as the degree to which the sugar should become lowered is that at this level the animal develops highly characteristic symptoms consisting of violent convulsive seizures with intervals of coma. These symptoms will terminate in death, but if dextrose in an amount of equaling 1 gram per kilogram of weight be injected subcutaneously the animal immediately recovers.

Among the effects of insulin, other than a reduction in the percentage of blood sugar, it was noted that in depancreatized dogs when insulin was given along with dextrose the respiratory quotient immediately rose decidedly, indicating that the power to metabolize carbohydrate had been restored; that when insulin was given, the acetone bodies disappeared from the urine and remained absent so long as the administration was maintained; that the percentage of glycogen in the liver is increased to or beyond the normal level.

The story of the development of insulin is one of the strongest arguments in favor of animal experimentation which the medical profession can offer to the antivivisectionist. Writing on insulin and

diabetes in the *British Medical Journal* of November 4, 1922, Dr. J. J. R. Macleod, professor of physiology, Toronto University, says:

"The effects of insulin in removing the cardinal symptoms of diabetes in depancreatized dogs, as well as those observed in normal rabbits, have been found also to follow its administration in the disease, diabetes mellitus, in man. Every detail of the therapeutic effects of this hormone was definitely forecasted by animal experimentation—the effect on the blood sugar and on the urinary sugar, the diminution of acetone bodies (to which the incidence of fatal coma is related), the prolongation of life, the raising of the power of metabolize sugar—and it was not until this had been established beyond doubt in the laboratory that insulin was given to the wards. Without the experimental demonstration of its effects no physician would have been justified in attempting the therapeutic investigation of insulin. Had he attempted to do so unguided by the results of observations on rabbits, it is almost certain that sooner or later an overdose would have been given, causing convulsions (not unlike those of diabetic coma itself) for which there would have been no indication as to what remedy should be used. The experiments on rabbits, however, showed clearly that these alarming symptoms are immediately antidedated by injections of glucose."

The new treatment of diabetes appears to open a bright prospect of relief, of longer life, and less severe deprivation to many sufferers of this very distressing and hitherto intractable disease. As we have seen, insulin has been successfully manufactured on a small scale in the laboratories of the University of Toronto. No supply is yet available for the medical profession in general. Its preparation on a large scale and its administration are still in the experimental stage. The authorities of the University of Toronto have taken special measures, appropriate to an exceptional situation, to protect and control the manufacture and use of insulin in Canada and the United States.

At present one firm is intrusted with the responsibility of developing the process of production on a scale sufficient to supply the number of sufferers from diabetes in the two countries, and the Medical Research Council of Great Britain has been delegated to supervise the preparation of the product in the British Isles.

The chemical nature of insulin is yet unknown and it appears that great variations in its activity may occur in the different batches made without any known variation of the process. For this reason the preparation of the product is being carefully controlled by the university, and insulin is issued only to physicians specializing in the treatment of diabetes in properly controlled clinics, who for the time being will report their results directly to the university and not in the various medical periodicals. (W. M. K.)

A FEW HINTS ON THE TREATMENT OF FRACTURES.

The errors in the technic of the treatment of fractures that have been found to be most unfortunate are those involving the shaft and lower extremity of the femur. In fractures of the shaft, immobilization is frequently cut short, while in fractures of the lower end the troublesome posterior rotation of the distal fragment is not corrected, with the result that there is shortening and marked hyperextension of the knee.

From our experience with fractures of the femoral shaft it has been found inexpedient to allow unprotected weight bearing short of six months. During the last two months of this convalescence, a Thomas ring caliper splint inserted into the shoe is employed. This is not worn except in weight bearing, and plenty of opportunity is allowed for treatment of the knee in order that it may function properly when the union is sufficiently strong to allow unprotected weight bearing.

As a rule, one may state that the more oblique the fracture is the sooner does union take place and the less likelihood there is of outward and forward bowing. Solid union of transverse fractures of the shaft is slow and refracture is not uncommon, requiring extra precautions.

Frequently in fractures of the shaft of the femur with overriding, the only method of correction is by skeletal traction, which is not used as much as it should be. The only efficient method, other than open reduction, in the anatomical reposition of the fragments in supracondylar fracture of the femur is the use of "ice tongs" applied to the femoral condyles.

The great advantage in using skeletal traction in fractures of the femur is that traction is not applied through the knee and motion of this joint can be continued throughout the treatment. A frequent problem in the convalescence of fractures of the femur is the restoration of normal flexion to the knee. Three distinct causes for stiffness of the knee may be mentioned; namely, long immobilization, involvement of the quadriceps in the scar of muscle trauma or callus, and the damage done the capsule of this joint by the traction that is usually applied to the leg. In fractures of the lower end of the tibia, particularly where both bones are involved and where there is considerable displacement, skeletal traction by means of a pin through the os calcis is very efficient and is productive of good results.

Skeletal traction need only be applied until sufficient union has taken place to prevent displacement in transferring the fractured extremity to a plaster retention apparatus, which may be used until solid but not necessarily bony union has occurred. The antagonism to this apparently radical method of treatment is grad-

usually being overcome because of its efficiency and to the rare occurrence of a mild osteomyelitis—or rather, more accurately, osteitis—as a result of the application of the traction directly to the bone. Countertraction is obtained by the use of the Thomas ring splint with the ring well padded against the ischial tuberosity. By employing an adjusting screw fixed to the end of the splint, attached to a spring balance which is connected with rubber bands which in turn are attached to the ordinary “spreader,” a known amount of traction may be applied. Severe pressure against the ischial tuberosity may be lessened to a considerable extent by attaching the distal end of the splint to the foot of the bed, which is elevated in order that the weight of the body may act as the agent that produces the countertraction, and eases the discomfort on the perineum.

It has been noted that, save in the above-mentioned fractures of the femur, the tendency has been toward unnecessarily prolonging the immobilization, particularly in fractures of the upper extremity. In the common Colles' fracture complete immobilization is employed for two weeks. At the expiration of this time, the anterior cocked-up splint is applied for two weeks more, with baking and massage daily to hasten the return of normal function.

In putting up a fracture, particularly near a joint, the position of election is the position in which the member would be most useful if ankylosis should take place, thus obviating a later operation in the cases that become permanently stiff. A few of these joint positions are dorsiflexion of the wrist (otherwise known as hyperextension), 90° flexion of the elbow, abduction of the upper arm, abduction and a few degrees outward rotation of the hip, slight flexion of the knee, and the avoidance of equinus and valgus of the foot. The few common exceptions to the above are: Fractures of the olecranon, Colles' fracture when the fragments can not be held in place except by flexion and ulnar deviation, fractures of the os calcis when the posterior portion has been evulsed by indirect violence, and other fractures in the same category where undue tension is to be avoided. (J. W. W.)

ON THE TREATMENT OF FRACTURE OF THE FEMUR.

In connection with a short description of a suspension apparatus for the treatment of fractures devised by Lieutenant Commander L. W. Johnson, Medical Corps, United States Navy, which appears elsewhere in this issue, a brief review of the principles of the treatment of fractures of the femur in which this apparatus is especially valuable may not be amiss.

As is well known, fractures of the upper third of the femur are usually oblique or spiral. The upper fragment is abducted, drawn

forward and rotated outward by the action of the ileopsoas, gluteus medius and minimus, while the lower fragment is drawn upward and inward by the quadratus, biceps, and abductors. The upper fragment can not be controlled to any great degree; therefore it becomes necessary to splint these fractures in flexion, abduction, and external rotation of the thigh. Fractures of the middle third are generally transverse, but may be oblique or spiral. The direction of displacement is not so constant at this level, but there is invariably some overriding, and the lower fragment is everted and tends to fall backward. In fractures of the lower third, the line of fracture is more commonly upward and backward and the lower fragment is usually drawn backward by the action of the gastrocnemius. This necessitates fixation of the fragments with the knee in flexion to relax this muscle and thereby facilitate reduction.

In fractures at all levels the tendency of the lower fragment is to outward rotation. Nonunion is rare in uncomplicated fractures of the shaft of the femur; but malunion with shortening, angulation, and rotary deformity is fairly common.

As the greater part of the deformity is due to overriding of the fragments, the prime essential is to overcome the shortening by traction on the lower fragment. Angulation and rotary deformity must be prevented and the normal anterior convexity of the femur should be preserved. To accomplish and maintain this reduction, various operative and nonoperative methods may be used.

The generally accepted method of nonoperative treatment is by traction applied continuously in order to overcome gradually the spasm of the muscles and to draw down the overriding lower fragment and to maintain proper alignment. The traction may be applied indirectly through bands attached to the skin, known as skin traction, or indirectly to the lower fragment, skeletal traction.

Skin traction, commonly used in Buck's extension, may be obtained by using adhesive plaster, moleskin plaster, or bands of muslin fastened to the skin by Sinclair's glue.

A few well-known general rules for the application of skin traction exist: The skin should be thoroughly cleansed, shaved, and dried. Ether should be used to remove all grease and favor firm adhesion of the plaster. The foot and ankle to several inches above the malleoli should first be bandaged. The adhesive bands should be wide and should be attached from a point several inches above the maleoli to well above the site of the fracture. The high application is less apt to slip and saves stretching of the knee-joint ligaments. These adhesive bands should be reinforced by a number of narrow strips placed obliquely about the leg and thigh, and they should be faced with a nonadhesive substance below the point of attachment.

The spreader should be sufficiently wide to allow complete freedom of the foot and ankle, but not so wide as to pull the adhesive away from the leg. The bands must be bound firmly to the leg and thigh to prevent the plaster slipping when weight is applied.

In recent years skeletal traction by means of the Steinman or Codavilla pins, the Ransohoff ice tongs, or the Finochietto stirrup has come into use. The advantages of skeletal traction are that it gives better control of position, the weight applied exerts twice as much traction as the same weight applied through the skin, the knee joint can be mobilized, and its ligaments are not weakened by stretching.

According to Dr. T. A. Dingman, who contributed a paper on this subject at the last annual meeting of the Medical Society of New Jersey, little or no pain is felt from skeletal traction unless the skin is pulled upon. For this reason, in applying it the skin should be pulled upward and under local anesthesia, a longitudinal incision made above and in front of the condyle on either side. With the skin still pulled upward the tongs are applied or the pin is driven through the bone. Skeletal traction may be maintained three to five weeks when union is well begun and only slight traction required.

The splints used with traction are the old Liston side splint, the inclined plane, the Hodgen and Smith suspended splints, and the Thomas splint, which may be used with or without suspension and pulley and weight traction. The suspended splints employed, usually with some modification of the Balkan frame, have been found more generally useful, as the leg is raised from the bed, making the care of the patient simpler and his comfort greater as well as permitting the position of the leg to be varied to favor the reduction of the fracture.

The initial weight used depends upon the musculature of the individual, but must be ample. From 30 to 50 pounds applied as skin traction is usually necessary in adults; half of this amount suffices when skeletal traction is employed.

Frequent radiographic examinations are useful to determine whether reduction has been accomplished and as a guide in the reduction of the weight after complete reduction has been effected.

Constant supervision with frequent inspection and measurement of the leg and adjustment of the apparatus is necessary. Early mobilization of the knee joint is essential. Early weight bearing must be avoided. Union is usually obtained in from seven to nine weeks, after which the traction which has been gradually reduced may be abandoned. The patient then should be kept in bed for a couple of weeks while massage and active and passive motions are used. He may then be allowed up on crutches, but full weight bearing should not be allowed for several months. (W. M. K.)

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ON THE MENTAL CAUSES OF ACCIDENTS.

When the "safety first" movement began to attract the attention of the practitioner of preventive medicine, emphasis was placed on the mechanical safeguarding of machinery as a means to fewer accidents, with the result that gears, belts, pulleys, once so dangerous because unguarded, now play a negligible part in accident causation. Nowadays almost all of the machinery mishaps occur at the point of operation, where perfect protection is not possible. Of these accidents, it is now generally held that as much as 70 per cent are due to the "human element," and that the remedy for carelessness is individual education.

The study of accidents, as they occur, reveals the fact that sometimes men may be injured as the result of carelessness which ordinarily they would not be guilty of. Fatigue or worry, undue haste or illness may temporarily throw a man off his guard.

The mental causes of accidents have recently been studied by Boyd Fisher, who has written a book on the subject. According to him, mental factors in accident causation fall into 5 main divisions and 15 subdivisions.

The main types of cause of accident are ignorance, predisposition, inattention, preoccupation, and depression.

Ignorance is the most prolific cause of accidents. Whether due to inexperience or sheer stupidity and incapacity to learn, ignorance causes more accidents than all the other mental causes put together.

In one sense, low mentality constitutes a kind of predisposition to accident. But there are also specific predispositions. First, there are the sense defects, such as poor hearing, defective vision, color blindness, and so forth. A man with defective stereoscopic vision, says Mr. Fisher, in a paper on the subject of mental causes of accidents which appeared in the *National Safety News* for November, 1922, sees all things in one plane, not knowing which of two objects is nearer, and may misjudge his movements. A man with poor balance should not be sent up on high places to work; a man without a sense of rhythm should not work on a punch press.

A man may possess a mental predisposition to accident. Attitudes unfavorable to safety are bravado or cheerful recklessness, the fatalistic belief that one is only hurt "when his time comes," and resistance to instruction. Where such attitudes give rise to resistance to safe practices or to failure to follow advice, the workmen are often-times unaware themselves of their reasons for such behavior.

A faulty habit is a predisposition to accident. Carelessness in closing hatches, in piling or moving stores, haste in the execution of work, even the failure to act in accordance with certain precautionary habits, are examples of the sort of tendencies which are likely to result in accident.

Inattention is a frequent cause of accident. A workman may suffer his attention to wander because of distractions in the plant, or because of boredom.

Preoccupation has the same result upon accident hazard that inattention has. Both serve to take the workman's mind off his task at a critical time. But simple inattention is due to a distraction, or desire for it, while preoccupations are compulsory distractions existing not in the surroundings of the worker. They are emotional "hang overs" brought into the workshop from the outside and are generally the result of bad family situations which the tactful practitioner of preventive medicine can often alleviate.

Sometimes a workman's emotional life becomes clouded with delusions, hallucinations, or other signs of insanity which may go undetected or recognized only as "queerness" for years, during which time compulsion keeps the attention generally distracted from the work. The menace to safety is apparent.

Depression is a state of lag in thought and movement due to physical conditions. Even mild disease conditions, while they do not generally unfit the workman for his task, do decrease his efficiency and render him less responsive to danger signals than usual.

Lowered vitality or temporary depression may be produced by conditions in the workshop. Ventilation or heating may be faulty. Illumination, besides the obvious effect upon visibility of unsafe conditions, has an influence upon fluctuations of mental efficiency.

An important cause of physical and mental depression is fatigue, which accounts for the fact that accidents tend to be more numerous toward the end of the morning and the end of the afternoon.

Such are the various mental causes of accidents as Mr. Fisher has analyzed them. But we should not forget that there is also the man who is always unsafe mentally. In the Navy the very young, the high-strung and excitable individuals have to be classed with the mentally deficient as accident risks and accorded special treatment. In fact, the whole problem of mental hazards is a problem of nice adjustments and individual prescriptions. Bulletin board remedies are not sufficient.

(W. M. K.)

THE TREATMENT OF CARBON MONOXIDE POISONING BY MEANS OF OXYGEN-CARBON DIOXIDE INHALATION.

The treatment of carbon monoxide poisoning has been in a more or less unsatisfactory state up to the present time and any method which gives promise of reducing the mortality and lowering the morbidity in this rather common accident is turned to with eagerness. Such a method of treatment has recently been formulated in

the laboratory of applied physiology, Yale University, as a result of the investigations of Henderson and Haggard with the collaboration of Stuart Scott.

These men were appointed a subcommittee by the Commission on Resuscitation from Carbon Monoxide Asphyxia to conduct investigations in the field and in the laboratory on the treatment of carbon monoxide asphyxia by inhalation methods and on related topics. The report of the commission to the American Gas Association contains the report of this subcommittee and its conclusions.

Their preliminary investigations covered the previous experimentation conducted in this connection and confirmed the correctness of the view that carbon monoxide has no direct action on the brain or other tissues of the body. It acts wholly through its combination with the hemoglobin of the blood and thus the hemoglobin is deprived, for the time, of the power to carry oxygen and asphyxia ensues. Support was also given to the belief that the combination of carbon monoxide with hemoglobin is reversible. That is, that through the mass action of oxygen the carbon monoxide which has been absorbed may be again completely displaced and the oxygen-carrying power of the blood may be completely restored.

The various methods of treatment were reviewed, giving an estimation of the individual effectiveness. It was noted that while oxygen inhalation was theoretically a very promising line of attack, it did not work out practically. It needed some auxiliary agent. This ineffectiveness was due, mainly, to the following causes:

- (a) There is no suitable apparatus for the administration of oxygen.
- (b) Its administration is usually delayed too long to be at all effective. The greater part of the carbon monoxide comes off in the course of three or four hours. It is in the condition of post-asphyxial coma, after the primary stage is past and most of the carbon monoxide has come off, which is usually seen in the hospitals.
- (c) When depression of vitality has gone to an extent which occurs after many hours of coma, oxygen alone is comparatively ineffective. Investigators in experiments in which they themselves were the subjects did not carry the asphyxiation out until coma resulted, and it is probable that observations under such conditions have led to a too favorable view of the benefits of simple oxygen inhalation in cases which have been asphyxiated into coma. When the depression of vitality has gone to the extent which occurs after many hours of coma in the case of a victim of an accidental asphyxiation, oxygen alone can not be relied upon.

The depression of respiration is due to several factors, principal among which may be mentioned initial overbreathing, disturbance of the alkali reserve, fatigue of the respiratory center, direct action of oxygen deficiency, and circulatory and edematous conditions.

In consequence of these and perhaps other factors, as yet not completely evaluated, the victim of profound asphyxia breathes so poorly that when oxygen is administered little is drawn into the lungs and little of the carbon monoxide is displaced from the blood, with the result that the benefits of oxygen inhalation are often scarcely perceptible. Some accessory factor is needed to stimulate breathing and thus draw oxygen in and wash the carbon monoxide out.

The writers considered that carbon dioxide mixed with the oxygen was the most natural means to employ. The addition of carbon dioxide to the inhaled air caused the breathing to be increased markedly in volume and a more rapid elimination of carbon monoxide was obtained. Where the individual was so depressed that carbon dioxide was not a sufficient stimulus to the respiratory center, manual artificial respiration was resorted to, in order to keep him alive until the oxygen-carbon dioxide is breathed a few minutes. The respiratory center is then stimulated to renewed and increased activity. The lungs are well ventilated, and under the mass action of this constantly renewed oxygen an approximately complete elimination of carbon monoxide from the blood in the course of 20 to 30 minutes is noted.

Animal and human experiments were carried out in large numbers upon this basis and they apparently lend strong support to this form of treatment. Through arrangement with the Consolidated Gas Co. of New York these findings were applied practically to cases of accidental illuminating gas poisoning occurring in New York City. One of the authors accompanied all rescue squads sent out by this company.

In the cases under observation and treatment according to the outlined views not a single case showed any observable ill effect as a result of the treatment administered. The respiratory response to the inhaled carbon dioxide consisted in a rapid increase in the volume of breathing up to full and deep pulmonary ventilation. Some were barely breathing and with weak pulse before the inhalation was begun. Some had to even be started breathing by manual artificial respiration.

Most significant was the extremely rapid elimination of carbon monoxide from the blood, the concentration falling from the asphyxial amounts to negligible percentages in 15 to 20 minutes.

Not a single case treated by the inhalation method developed the more or less common asphyxial sequela—pneumonia.

The conclusions drawn by the committee from the observation of a large number of cases of actual poisoning by illuminating gas are as follows:

(1) Manual artificial respiration by the prone pressure method should be employed to start spontaneous breathing. This object may be assisted by administering oxygen and carbon dioxide simultaneously.

(2) Inhalation of oxygen and 5 per cent carbon dioxide by causing a very full ventilation of the lungs rapidly eliminates carbon monoxide from the blood and thus terminates the condition of asphyxia. This treatment is highly effective if applied early enough. It requires merely general medical supervision and may be safely and efficiently carried out by intelligent men of the type composing the emergency crews of a city gas company.

(3) Until more definite knowledge has been obtained regarding the conditions in the lungs, brain, and elsewhere subsequent to gassing, and until treatment can be based on such knowledge and has been tested experimentally, it is inadvisable to apply any specific treatment to post-asphyxial gassing cases. The evidence here reported indicated that oxygen-carbon dioxide inhalation and rapid elimination of carbon monoxide greatly decreases the liability to nervous and pulmonary asphyxial sequelæ. (G. H. M.)

USE OF THE STETHOSCOPE IN COUNTING THE HEART BEATS DURING ANESTHESIA.

During anesthesia it frequently is of much importance to know the pulse rate correctly, and the usual method of counting the rate in the temporal arteries is not always consistent with accuracy. Particularly is this so in patients who are not in good condition and the heart beats can not be counted because of their rapidity and weakness.

The bell of a Bowles stethoscope can be readily attached to the chest wall over the apex of the heart and held in place by a strip of adhesive plaster. The rubber tubing can be adjusted to a length sufficient to reach the binaural metal piece comfortably fitted to the ears of the anesthetist. This would not in any way interfere with the sterilization of the field of operation nor the operator in any operation excepting possibly rib resections on the left side, thyroidectomies, or other operations about the neck.

In this method of using the stethoscope accurate counting of the very weakest heart beat can be done, and if the anesthetist has his hearing apparatus highly tuned to the relative pitch and intensity of the heart sounds and will note them before beginning the anesthetic he can very readily distinguish any variation in the intensity indicating a beginning or a progressive weakness of the heart muscle.

It is very satisfying to the operator to know that he is getting accurate reports of the patient's condition during an operation. The present method of reporting a patient as "doing well" or the more

alarming "the heart beat is so fast that I can not count it" can not be considered as a satisfactory report of how the patient is standing the anesthetic. How much better it would be to report "the heart rate is 120, increased 10 beats during the last five minutes;" "heart sounds have not changed in intensity"; respiration 22, increased 4 in last five minutes." This would mean something.

In a case where the blood-pressure readings are desired the bell of the scope can be fixed in the same manner in the antecubital space and an assistant can obtain the variations in the pressure without disturbing the operator or his sterilized field of operation.

This would certainly be a marked improvement on the present manner of reporting the condition of a patient during anesthesia and would have the very great advantage and importance of being accurate. (J. J. O'M.)

CLINICAL NOTES.

A CASE OF ACUTE STREPTOCOCCUS PENILE GANGRENE.¹

By L. B. GREENE, Lieutenant, Medical Corps, United States Navy.

I believe that this condition is of sufficient rarity and importance to justify a report. I have failed to find a similar case in the records of this hospital. It is occasionally encountered in the urological clinics of the large city hospitals. I saw such a case, in Doctor Keyes's service, some months ago. The condition is often accompanied by scrotal gangrene and the mortality, in reported cases, has been around 25 per cent. It is not my purpose to review the literature in this paper.

The patient is a robust young man, age 19. Admitted June 6, 1922. He states "that he noted a small area of redness on the dorsal aspect of the shaft of the penis about 18 hours ago." Twelve hours later there was general redness, enormous swelling, and pain of the entire shaft of the penis.

Examination: There was a moderately severe scabies rash over the entire anterior surface of the trunk and thighs. The penis was swollen to four times the normal size; it was dusky red and edematous. There was an area about the middle of the dorsal aspect of the shaft that was almost black. The skin was unbroken, in so far as I was able to judge. Tenderness was marked. Under procain one-half of 1 per cent, dorsal and ventral slits were made and the prepuce retracted. The mucous membrane was intact. There was no evidence of urethritis or other venereal disease.

There was marked prostration. Temperature 104. Pulse 120. Respirations 25. White blood count, 14,850. Culture made from puncture through seared skin gave a pure culture of streptococci, long and short chains. The organism was not cultured on blood media.

June 9, 1922. Line of demarcation near base of penis. Practically all of the skin intervening between it and the mucous membrane is distinctly gangrenous and was removed without anesthesia and occasioned almost no pain.

During the next week, the subcutaneous tissue was removed with forceps, and granulations began to form. By July 1, epidermiza-

¹ From the Urological Service, U. S. Naval Hospital, League Island, Pa.

tion was practically complete and the patient was up and around the ward.

The treatment employed was simple mechanical cleansing by pouring sterile water over the penis from a pitcher, from a height of about 12 inches, and a continuous Dakin dressing in the intervals. It was exposed to direct sunlight on the tenth day and daily thereafter.

The patient was discharged, after about four and one-half weeks. There was considerable scarring and distortion. It will probably be necessary to do some plastic surgery later.

SUSPENSION APPARATUS FOR SICK-BAY BUNKS.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

Suspension apparatus for treatment of fractures, such as is used in shore hospitals, occupies too much space to be suitable for use in the sick bay on board ship. The one here described was designed to fit the bunks used on the U. S. S. *Mercy*. It was made for use on the U. S. S. *Vestal*.

It consists of a beam, 2 by 3 inches, with hooks to secure it to the frame of the upper bunk; a sleeve with an eye to which is spliced a rope and toggle for a handhold, so that the patient can raise his body from the bed to allow change of position, use of the bedpan, or change of linen; two sleeves connected by a rod of one-half inch steel on which pulleys can be hung as required. The sleeves are movable and interchangeable. The beam can be placed at any position or angle desired. The hooks are covered with rubber tubing to prevent marring. All metal parts are heavily nickel plated.

The apparatus has proved very satisfactory and the motion of the ship has not interfered with the treatment.

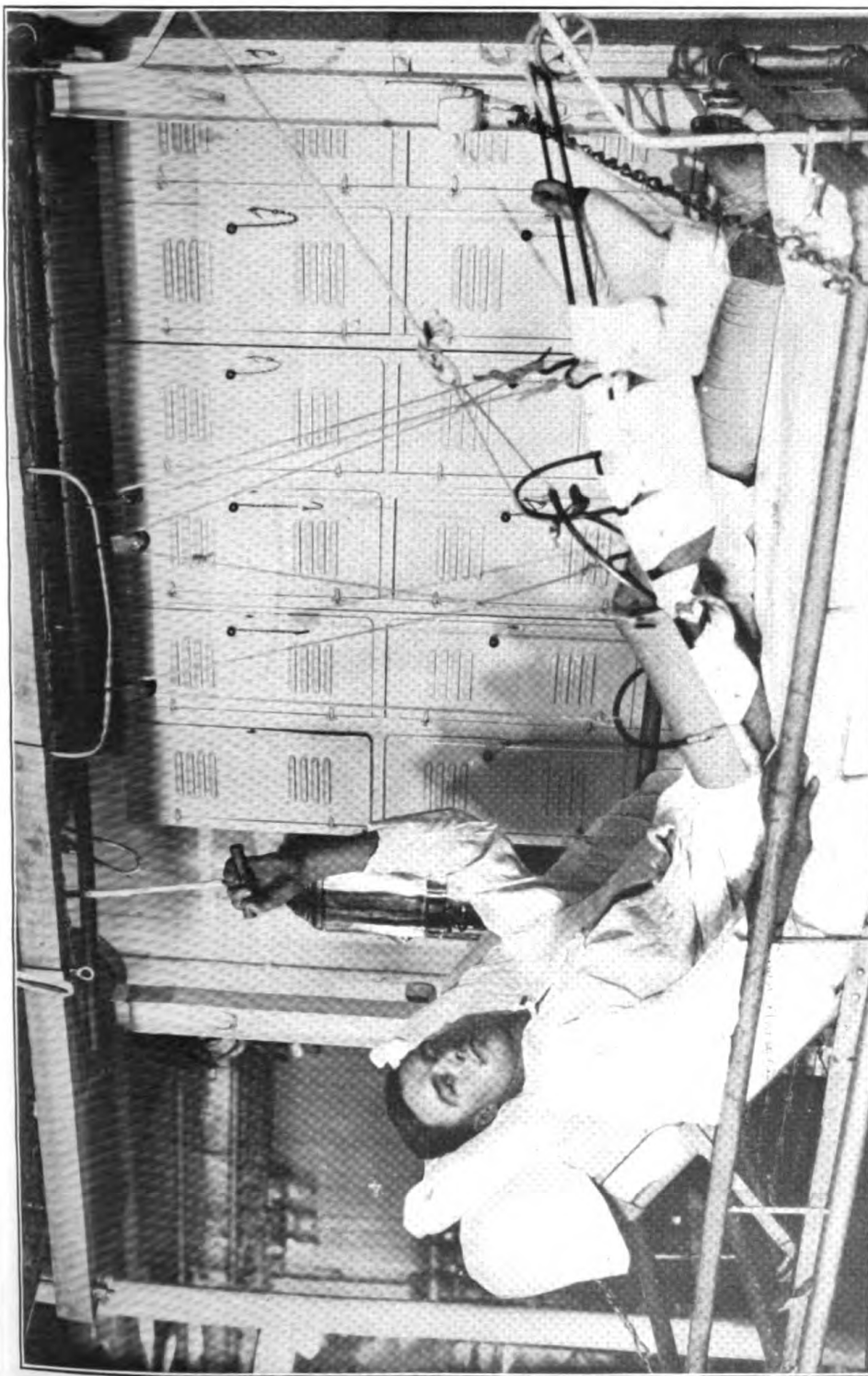
MULTIPLE HERNIA.

By LUCIUS W. JOHNSON, Lieutenant Commander, Medical Corps, United States Navy.

This case is interesting because of the rare occurrence of three large hernias in one man. It is also of value since it shows that the most striking defect is not always the primary seat of the trouble and the diagnosis that is most obvious is not always faultless.

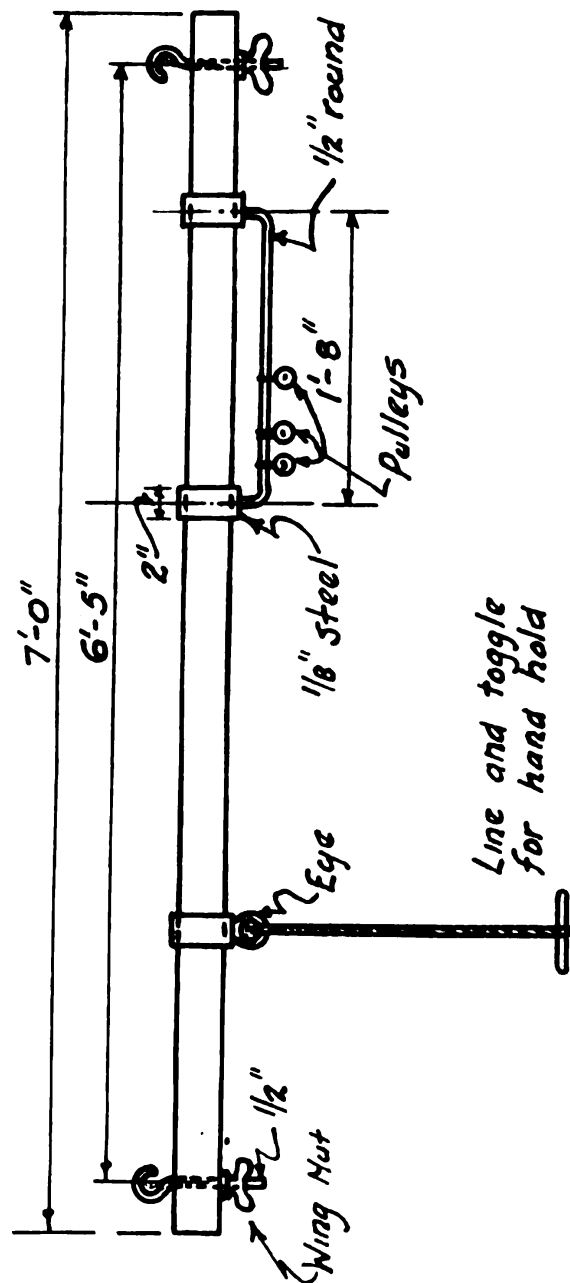
A man of 62 was taken sick with sudden pain in the abdomen followed by vomiting. I first saw him 36 hours later when he was very weak from the persistent vomiting. The character of the vomiting suggested high intestinal obstruction.

Physical examination showed a very fat man with a hernia 6 inches in diameter at the umbilicus, another hernia as large as an orange just below the ensiform cartilage and a large left inguinal



SUSPENSION APPARATUS FOR SICK BAY BUNK. FRACTURE OF FEMUR. TRACTION BY STEINMANN PINS AND HODGEN SPLINT.

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SUSPENSION APPARATUS FOR SICK BAY BUNK.

hernia extending into the scrotum. The inguinal hernia and that at the ensiform cartilage could be reduced with difficulty, but the umbilical hernia was hard and could not be reduced. The type of the vomiting and the irreducible hernia seemed to justify a diagnosis of high strangulation. Operation was thought to be advisable in spite of his weakened condition.

An incision was made over the umbilical hernia. It contained the transverse colon, many loops of small intestine, and a great deal of omentum. The colon was distended and purple, but peristalsis and circulation returned after freeing it. Evidently it had not been strangulated for 36 hours, and also it was too low down in the intestinal tract to produce the type of vomiting which the patient had. The other hernias were explored and easily reduced from within. Further search revealed an area of acute peritonitis which led us to the pylorus where we found a large cancer which had perforated. His condition was then so poor that nothing more than drainage was attempted. He died within 24 hours.

Evidently the perforation at the pylorus was the beginning of the acute condition. The vomiting which it caused forced additional coils of gut into the sac, producing strangulation as a secondary condition.

OBSERVATION ON A SERIES OF 15 FRACTURES OF THE MANDIBLE.

By J. L. BROWN, Lieutenant Commander, Dental Corps, United States Navy.

The treatment of ordinary peace-time injuries of the mandible is an easy matter compared with the gunshot wounds inflicted in modern warfare, nevertheless these injuries require some special attention and skill in their management if successful results are to be obtained. The ordinary textbook information on the management of such cases is rather limited, and only since the recent war has any progress and advanced technique been offered, and that largely in relation to war injuries. Fractures of the mandible are not uncommon in the naval service, and often are produced at a time and place which renders proper care difficult with the means at hand. In view of these considerations it is believed timely to offer these observations on a series of 15 fractured mandibles, all among enlisted men between the ages of 19 and 35, treated aboard the U. S. S. *Mercy* during the past year.

The treatment of mandibular fractures aboard ship requires special attention other than mere fixation. Due to the movement of the ship, particularly when steaming, and in foul weather, and especially where the fixation maintains both arches in normal occlusion, such complications as nausea from seasickness and stumbling or falling might occur. Other handicaps, such as tonsillitis, odontologia, Vin-

cent's angina, and systemic disturbances, constitute additional factors to be considered.

In order to guard against such complications as far as possible the preliminary treatment of such patients consists of a routine system, embodying a mouth wash every hour, or more often if required, rest in bed, catharsis, liquid diet, and oral prophylaxis, in addition to temperature, pulse and respiration observations, urinalysis, blood examination, and a Wassermann test. Following this a more accurate clinical and X-ray examination is made, and, as soon as the case permits, which is ordinarily in the course of from 2 to 10 days, reduction and fixation is accomplished. It is believed that this period of time, together with the preoperative treatment, in most of the cases, accounts largely for the ease in reduction and fixation, and renders the use of anesthetics unnecessary. The frequent administration of a daily antiseptic spray, under 30 to 35 pounds pressure, during the period of fixation is advantageous, and not only lends to the comfort and contentment of the patient but greatly assists in maintaining as clean a field as possible.

Immediately following reduction and fixation the case is checked by further clinical examination, with careful and detailed observations for symmetry and contour of facial lines, as well as by X-ray observations for proper alignment and apposition of the fragments. It has been found advisable to restrict liberty during this period and yet to allow patients to perform some light duty when they are able. Upon removal of the fixation appliances another course of oral prophylaxis is administered and the patient is instructed in the care of the mouth and teeth.

Of the 15 cases of fractured mandibles in this series, only 1 required an anesthetic, ether being employed, on account of the necessity of refracture and not for reduction and fixation. There were no articular dislocations complicated with these fractures.

Five were multiple fractures; 9 were fractures of the mandible involving the third molar teeth, of which 8 were on the left side and 1 on the right; 8 were in the region of the premolars; 3 were in the region of the anterior teeth; of the 9 fractures at the angle 5 were multiple; of the 5 multiple fractures all sustained fractures on the opposite side but 1, which was in the region of the premolars of the same side, and 1 of these opposite-side fractures was in the region of the anterior teeth. There were 10 single fractures, none at the condyle, no edentulous cases, and no pathological fractures; there was 1 case of extra oral drainage due to suppuration. A total of 27 teeth were involved. Seven were complicated cases involving refracture, nonunion, extra-oral and intra-oral sinuses, heavy colds, tonsillitis, and incorrect original diagnoses, which account for the large number of sick days. The method of fixation in 11 cases

was by interdental wiring, including 4 expansion arches as retaining appliances; the expansion arch was employed in 5, 1 was bandaged, at night only, and 2 required no fixation. The total number of sick days was 792—of which the longest case required 331 days and the shortest 23 days (1 case of 10 days' duration is excluded, due to transfer to a hospital ashore)—and the average, 53 days. The results were satisfactory in all 15 cases, good union and normal occlusion was obtained, and only 3 teeth of the 27 involved were lost. There was a loss of weight in all but three cases, and no trismus.

One case, that of a recently united fracture, required refracture due to previous faulty fixation through the employment of the old-fashioned vulcanite splint. One other case was a nonunion of long standing due to previous and insecure interdental wiring. These two cases alone mark the necessity of careful attention to detail, and signally emphasize the efficiency in the employment of the dental arch as a splint with fixation maintained by careful and painstaking interdental wiring.

No claim is made for anything original in the method of fixation used in this series, as only old and recognized means have been employed, with due regard for their selection in the individual case. It was long ago pointed out that the use of the dental arches, secured in normal occlusion, furnished the best splint, and it only remains for the operator to determine what method of fixation is adaptable for the case at hand. In the naval service wiring obviously has many advantages over other methods requiring impression taking and a loss of time and labor necessary in making and adapting interdental splints, not to mention the pain and discomfort of the patient.

The interdental wiring method of fixation was employed in most all cases in this series; however, in a few it was possible to secure adequate fixation by use of the common expansion arch alone, and in others by a combination of both.

The method of wiring varied according to the location of the fracture, the teeth involved, and the number of teeth missing. The method most frequently employed was the old single ligation of the individual teeth in sufficient numbers to assure firm fixation with an allowance for breakage without interference in fixation. A 27 or 28 gauge ligature wire, such as is on the supply table, was passed around each tooth through the interproximal spaces and twisted tightly, allowing an ample twisted length to be united with a similar one from the opposite arch, the ends not being cut too short in order that they may be bent distally and tucked away in the interproximal spaces to avoid abrasions to the lips and cheeks. The practice of covering these twisted ends and kinks with temporary stopping is abominable and useless, indicates inattention to detail; the stopping be-

comes foul smelling, and lends an uncomfortable wartlike feeling to the patient, in addition to preventing the proper use of the antiseptic sprays and mouth washes. The use of the orthodontic appliance known as the expansion arch, secured by clamp hands, has proven an invaluable asset in fixation of the fragments where there is not too much displacement and the fracture is anterior to the first and second molar teeth. It often obviates the necessity of wiring the two jaws together. This is a very satisfactory method to employ aboard ship and in complicated cases, as it permits the free movement of the jaw, which in itself is an advantage greatly to be desired. Oftentimes in multiple fractures involving the angle it is found that the fractures at the angle gain union before the one in the anterior region. In these cases the interdental wiring can be removed and the expansion arch employed to secure continued fixation during the time necessary for union of the latter.

The various bandages were never used in this series except as a first-aid measure, at night during the sleeping hours, to maintain safe fixation in cases requiring practically no fixation, such as incomplete fracture, or when there was good apposition and no displacement.

The value of teeth involved in the line of fracture can not be too carefully considered, as they lend an important factor in the apposition of the fragments during reduction. Obviously in long-standing and infected cases they should be removed, but otherwise their early removal opens an avenue of infection.

The cooperation of the surgical service of the U. S. S. *Mercy* has been a great factor in the care and treatment of these patients. By its assistance in the surgery, and in the daily routine care both in the surgical ward and the dental surgery patients have been spared a great deal of suffering and have acquired a successful result. The records of this ship show that during the last fiscal year there were a total of 18,778 sick days due to diseases and 4,256 sick days due to injuries. The fractured mandibles account for 18 per cent of the total sick days due to injuries and 3.5 per cent of the total number of sick days for all causes. They represent a rate per thousand of sick days due to injuries of 183. In other words, out of every thousand sick days due to injuries, 183 were due to fractured mandibles, which disability rate, in view of this special type of injury, is considered quite high.

A REVIEW OF VENEREAL DISEASES TREATED ABOARD THE U. S. S. "RELIEF" IN ONE YEAR'S TIME.

By A. J. CHENERY, Lieutenant, Medical Corps, United States Navy.

From October 1, 1921, to September 30, 1922, there were admitted to the urological department of the U. S. S. *Relief* a total of 212 patients with symptoms clinically indicative of venereal disease.

The following table shows the conditions as finally diagnosed, there being 225 cases of venereal disease—or 109.3 per cent venereal infection among 206 patients—3 patients with nonvenereal diseases, and 3 patients with no disease.

Syphilis.—Chancre (8 cases 2 or more lesions), 40; syphilis (previously treated), 25; secondary syphilis (moist papules), 4; syphilis central nervous system, 3; chancre and chancroid (mixed), 6; chancre, chancroid and gonorrhea, 3; chancre and gonorrhea, 3. Total, 84. Per cent, 40.8.

Chancroid.—Chancroid (only), 24; chancroid and chancre (mixed), 6; chancroid and gonorrhea, 4; chancroid and chancre and gonorrhea, 3. Total, 37. Per cent, 18.

Gonorrhea.—Gonococcus infection urethra, 73; gonococcus infection epididymis, 17; gonococcus infection joints, 3; gonococcus infection prostate 1; gonococcus infection urethra and chancre, 3; gonococcus infection urethra and chancroid, 4; gonococcus infection urethra, chancre, and chancroid, 3. Total, 104. Per cent, 50.5.

AIDS IN DIAGNOSIS.

1. *History*.—The history of the case is always of importance, especially so if accurate data can be obtained, and this is nearly always possible if the patient is approached in a spirit of helpfulness and no attempt is made to browbeat him. Many patients are at first reticent, hoping to save their pay from checkage, but once their confidence is won they are more than willing to give all possible information.

2. *Clinical appearance*.—The number of cases of multiple chancres in this series (20 per cent) and the occurrence of mixed lesions of chancre and chancroid, together with the presence of single lesions in the case of chancroids, prove the fallacy of attempting a clinical diagnosis as a routine procedure and again serve to emphasize the importance of laboratory aids.

There were two interesting cases of extragenital chancre in this series, one on the lateral surface of the tongue and one on the neck in the anterior chain of cervical lymph glands. (In the second case patient admitted being bitten by a woman.) The incubation period of the lingual chancre was 14 days, while in the other case approximately 1 month elapsed between intercourse and appearance of the lesion. Dark field and Wassermann tests were positive in both cases.

3. *Laboratory aids*.—In all our cases it was possible to make a definite diagnosis with the aid of laboratory procedure, through the close cooperation of Lieut. Jesse W. Smith, Medical Corps, United States Navy.

The methods used consisted of the dark field illuminator for detection of the spirochaeta pallida, Wassermann reaction, used in all cases, and the Gram stain in cases of gonococcal infection.

TREATMENT.

1. *Syphilis*.—Of the arsenicals neoarsphenamine is used exclusively. It is given in 0.9 gram doses in an ordinary 20 c. c. Luer syringe, with a 23-gauge needle and at the rate of 1 c. c. every five seconds. While its therapeutic index is believed to be slightly inferior to that of arsphenamine, it is much safer and less cumbersome of administration. In over 1,000 injections given aboard this vessel during the past 12 months there has not been a single case of severe reaction.

Mercury salicylate in 1-grain doses, intramuscularly, is used in conjunction with neoarsphenamine, being given weekly, while the latter is administered every fifth day.

For all cases with primary infection or untreated secondary cases we give 10 to 12 injections neoarsphenamine and 7 to 8 injections mercury, at the end of which time the blood Wassermann is usually negative. However, should the Wassermann remain positive we continue the treatment for 15 days and then return the patient to duty, provided there are no open lesions, regardless of whether or not the blood is positive. A spinal puncture is recommended in all cases at the end of the treatment period. A second course of treatment, consisting of 8 to 10 injections of neoarsphenamine and 6 to 7 injections of mercury salicylate is suggested to begin at the end of three months following the completion of the first course. After that no definite method of treatment can be outlined, but needless to say all cases should be carefully supervised by medical officers having them in charge and frequent Wassermann examinations made. Especial attention should be given to the neurological examinations of all old luetic patients and lumbar puncture made at the first indication of trouble. For some unexplained reason present statistics show a considerable increase in the percentage of neurosyphilis.

In treating cases involving the central nervous system it is our practice to use neoarsphenamine and mercury salicylate in the usual dosage, supplemented biweekly by intraspinal treatments, following the Swift-Ellis technique.

2. *Chancroid*. Chancroids are first cauterized with phenol and alcohol and afterwards treated with argyrol crystals. In cases of marked edema and extensive ulceration, necessitating dorsal or bilateral slits, moist dressings of 5 per cent sodium citrate or saturated solutions of boric acid are used with marked effect. Ambulatory patients suffering from chancroidal infection are prohibited from all violent exercise, the prevention of buboes being the objective. The groins are carefully watched and at the first sign of periadenitis patients are placed in bed and hot applications applied to the affected parts.

3. *Gonorrhea.* Cases of acute gonococcal urethritis are treated with a 2 per cent solution of mercurochrome, followed at proper intervals by soundings and prostatic massage. As a rule these patients are not kept in bed. For instillation and urethroscopic application silver nitrate is used practically exclusively, the strength varying with the individual reaction. Some patients stand a 10 per cent application well, while others rebel even when the strength is reduced to one-tenth of 1 per cent.

Potassium permanganate in from 3,000 to 8,000 dilution is used as an irrigation following all forms of instrumentation or prostatic massage.

The average treatment period of gonorrheal cases in this series has been about 35 days. No man is returned to duty until his discharge has ceased for at least 4 days, his urine is clear, and prostatic examination negative.

In all cases of epididymitis injections and instrumentation of all kinds are absolutely forbidden. The affected parts are elevated and kept elevated at all times. For this purpose we use either the bandage designed by the late Dr. Samuel Alexander and described by Keyes in his *Urology*, 1920 edition, or an ordinary jock strap with cushions of padded gauze.

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NOTES AND COMMENTS.

Recently a fire occurred in the battery compartment of the U. S. S. *R-4*. It was readily extinguished with Pyrene and the compartment was closed. Several hours later the compartment was opened, and after what was considered a reasonable interval for ventilation five men entered for the purpose of estimating the damage produced by the conflagration. They remained in the compartment about 5 minutes. The gas encountered was not irritating, the only effect noted being a pleasant intoxication. Shortly after leaving the compartment each of these men began to experience a feeling of weakness, and all collapsed within 15 to 20 minutes, one becoming unconscious and remaining so for 1½ hours. This man exhibited cough with bloody expectoration. With the exception of this man, all recovered promptly, although each suffered from a severe headache which lasted until the next day.

In order to explain the various symptoms displayed by these men one must consider an atmosphere containing varying percentages of carbon monoxide, carbonyl chloride (COCl_2 , phosgene), and carbon tetrachloride.

Carbon monoxide would give the "pleasant intoxication," weakness, collapse, and unconsciousness in the comparatively short time, and it is nonirritating. Severe headaches are characteristic sequelæ. One would expect this gas in measurable quantities in a burning compartment.

Carbonyl chloride (phosgene) is formed where carbon tetrachloride is broken down by heat; it is not irritating in the concentrations one would probably find under these conditions; it causes weakness, collapse, cough, and bloody sputum. The onset of these symptoms are usually somewhat delayed (two to three hours) unless the individual is performing muscular work, or it is sometimes noted that chilling or even active digestion may eliminate this delay.

Carbon tetrachloride itself is not unpleasant to breathe; it is nonirritating and may operate to cause headache, weakness, and collapse through its "blanketing effect," thus forming an irrespirable atmosphere. It probably would not be irritating enough to cause cough and bloody sputum.

A report on the bacteriology of canned meat and fish prepared by the Food Investigation Board, a Government institution in Great Britain, has recently been made public. It represents the first comprehensive study which has been made in that country of the bacteriology of these food products both when sound and when unfit for human consumption. The members of the board made a very detailed examination of 323 tins of canned food, 246 of which were rejected as defective, while 77 were sound, we are told by an editorial writer in the *Lancet* of October 21, 1922.

The most striking fact in the report is the comparative non-sterility of tins externally sound with perfectly good contents. Less than 30 per cent of these tins when examined were sterile, and the percentage not sterile ranged from 36 for sardines to 100 for crab. Of canned meat 63.6 per cent of the tins were not sterile. While many of the types found belonged to groups which the authors of the report show elsewhere in the report to be incapable of developing decomposition changes, this was by no means always the case, for bacilli, aërobic and anaërobic, were isolated which differed in no way from strains which were shown to be the cause of decomposition in unsound tins. The report gives the deathblow to the generally accepted conclusion—accepted even in scientific circles—that canned foods remain good because the processes of preservation by heat have sterilized them. Whether the foods remain good depends not only on the numbers of living bacteria introduced and their kinds, as well as upon the efficiency of the heating given, but and to an important extent, upon the physical conditions within the tin. Of these conditions by far the most important is air access, which acts not mainly because it may introduce bacteria from outside but because it supplies oxygen to bacteria already viable but dormant in the food. "To remain sound a tin must be and remain airtight." Of particular interest is an account of special investigations upon the relationship between oxygen requirements and decomposition changes. The authors took 17 tins of salmon, herrings, lobster, and other marine substances, purchased in the open market and apparently perfectly sound, and incubated them with air access, so arranged that the entering air was free from bacteria, for periods up to 16 days. Of these 17 tins no less than 12, or 70 per cent, became definitely unfit for food, and if the tins were sealed up again after an interval, "blown." From the tins anaërobic or aërobic bacilli were readily isolated, identical with those shown to be the cause of spoilage. Controls of the same brand, incubated without air access, remained good and appeared sterile when bacteriologically examined. These results were confirmed by another series of experiments conducted on rather different lines. The members of the board advance the view that these organisms are present as spores in the majority of marine food products, but are unable to develop until conditions are suitable. Given air access similar products are elaborated, and then they can develop, multiply, and decompose the food. An extended study of the types of bacteria found in these foods, sound and unsound, was made, the authors grouping them under molds and yeasts, obligate anaërobic bacilli, sporing aërobic bacilli, and micrococci. Each group is critically considered as a cause of unsoundness. They show that much depends upon the presence of proteolytic properties, the ability to produce gas from carbohydrate and allied substances, and upon

the requirements of the organism as regards oxygen. It is further brought out that the kind of food influences the type of organism associated with spoilage. For example, although yeasts are the common cause of spoilage in milk they are unimportant in meat and fish, anaërobes are very important as regards meat, while non-sporing aërobes of the types of *B. coli* and *B. Cloacae* are of significance for marine products.

As an illustration of the methods and of the thoroughness of the investigations made, the group of sporing aërobic bacilli may be selected. The authors show in detail that not only are these bacilli found equally in all their three groups of tins—the sound shop tins, samples rejected but with good contents, unfit samples—but that the types which possess proteolytic properties, and which therefore are potentially capable of causing decomposition, do not occur unless the tin has an undetected leak. Following this up, they demonstrate that when sterile air access is permitted decomposition follows the inoculation of a tin with a pure culture. They make the further observation, which they regard as new, that a considerable proportion of these canned food strains grow readily under ordinary anaërobic conditions and definitely, but with difficulty, under the severest anaërobic conditions they could devise. Such an observation suggests a dilemma, since it leaves them to explain why living organisms, which are proteolytic and can grow without any oxygen, do not, in fact, develop and ruin the contents of the tin. By a further series of experiments they demonstrated that while these strains can grow under anaërobic conditions, they then do not produce sufficient enzymes to supply them with the simple products necessary for their growth. These experiments confirm the others mentioned above as to the primary necessity of a supply of oxygen if decomposition is to take place. It will be appreciated that these experiments and the results of the systematic examination of unsound tins have an important practical bearing upon canning problems. They illustrate how very complex are the processes at work and how far removed is the whole subject from the simple views which are generally accepted. The report, it will be gathered, is mainly concerned with spoilage conditions and does not discuss the relationship of canned foods to outbreaks of food poisoning; but it is perhaps worth mentioning that none of the recognized food-poisoning organisms—salmenella strains or *B. botulinus*—were present, although looked for in every tin.

An editorial writer in the *Lancet* of September 30, 1922, setting forth the need of young doctors capable of carrying out the special work required of medical officers in the Royal Air Force, sums up the activities of the flight surgeon as follows:

“In no branch of modern progress is the confidence of safety so much required as in aeronautics. Insurance companies demand air-

worthiness of the craft; the airworthiness of the pilot is of equal importance, for the chief risks in flying are still due to the human element in it. Those who practice flying must possess certain physiological qualifications before they can adapt themselves to the conditions which flying imposes, with its varying and often lofty altitudes, swift motion, and changes of position. The pilot must possess an eye for judging space and distance; to land and take off well he needs accuracy of vision, both perceptive and stereoscopic. Above all, he must possess the spirit for flying, the psychological stability that reacts normally to the stresses of danger. Early in the war it was found necessary to fix standards for selection, and as the result of research and experiment certain tests were devised which have been described in these columns. The application of physical efficiency tests is still to some extent empirical, but in practice they have proved of substantial value. Broadly speaking, experience tends to show that the chief qualifications required for the airman from the medical point of view are the following:

"(1) Good vital capacity, with a properly acting respiratory pump. The one is of little use without the other; a large chest is inefficient if coupled with flabby abdominal muscles and feeble descending diaphragm. A respiratory pump which does not secure the quick return of venous blood to the heart reacts on the cardiovascular system.

"(2) Well-adjusted cardiomotor system, able to tolerate lack of oxygen, diminished pressure, fatigue, and emotion without undue disturbance of the relation of systolic to diastolic pressure, and without undue acceleration or irregularity of the pulse.

"(3) Stable nervous system, with sufficiently quick reaction time to afferent stimuli, expressed in muscularly coordinated effort.

"(4) Good function of eye and ear. Visual acuity, fusion sense, binocular vision, and coordination of both sets of extra-ocular muscles. Intact vestibular function, healthy Eustachian tubes, and upper air passages.

"(5) Suitable mental 'make-up.' Much can be gathered from the way in which questions are grasped and answered, and in which directions are obeyed. Favorite pursuits and hobbies, reasons for wishing to fly, give valuable indications of temperament. The history of athletics is valuable in affording information, for games may be regarded as psychomotor reactions carried out under congenial circumstances.

"Careful as it is necessary to be in choosing candidates for civil aviation, yet more care is needed in selecting men for the Royal Air Force. Combatant service means flying at the highest possible altitudes, and the practice of various evolutions known as 'aërobatics' which require the topmost degree of mental alertness. In early days, before the tests now in use had reached the stage of tried utility, it was a common thing to hear of aëronauts fainting in the air, becoming giddy, or turning sick and vomiting, so much so that flying was said to be producing new diseases. Flying has produced no new disease; it has only brought out in men not fitted to stand it their maladaptations to altitude or rotatory motion. Untoward occurrences are now rare, a fact which may fairly be set down to improved selection of candidates based upon standards of physical efficiency ascertained

by examination of specially fit pilots during the war. There is yet much research to be done before the physical efficiency tests become standardized and their significance proved by actual figures. The selection of the pilot is, however, but the first stage; after he has been passed in fit he has to be kept at concert pitch by continuous attention of the medical officers, and this supervision to be efficient implies special training on the part of the doctors themselves. This consideration it was which was then and still is the justification for a special medical branch of the Air Force. The standard of fitness for flying efficiency being so high, it is the more easily lowered by factors adverse to perfect health. The effects of tropical climate and disease, lack of exercise, late hours and alcohol, financial and domestic worry or other psychic troubles, are factors potent to cause a breakdown if not detected in time. In these circumstances the physical tests employed for entry are of equal value to detect signs of deterioration. Put into requisition whenever a flying officer has been on the sick list before he is again allowed in the air, they are also used as a routine measure in the annual survey and assessment of the Air Force. As in other branches of medicine the value of this preventive policy can not be estimated. It is obvious, however, that the forestalling of danger can only be efficient when there is complete confidence in the medical officer on the part of the pilot. A medical officer who is entitled to wear wings is at a great advantage in eliciting from a pilot the fact that he feels stale. Such mental confidence is not to be attained easily between a pilot and an outside doctor. Nothing is more depressing to a flying man than to realize that the doctor inquiring into his case, describe it how he will, can not grasp the points he is trying to make. Lack of this knowledge and sympathy was a fundamental weakness of the earlier medical boards on flying officers. A headache may be merely due to indigestion or it may be the first sign of oncoming flying stress; yet in the early days of a flying pilot complaining only of headache would have obtained scant sympathy from a board. It takes a number of men on the ground to keep a machine in the air, and their efficiency is also a factor in maintaining safety in the air. They are mostly skilled mechanics at a particular trade, whose life is spent largely in workshops subject to special trade risks. The coming of the noncommissioned pilot presents a problem of its own in selection. Except for his being housed in barracks, it may be said that the life of the airman and the problems of his physical training and well-being differ widely from those of the soldier.

“Medicine in the Air Force has therefore its special interest in the problems connected with keeping the flying personnel in a state of full efficiency, and while much has been done to improve safety in the air by eliminating the unfit and keeping the fit up to their work, there is still field for research. Medicine has also its ordinary inter-

ests in sick quarters on the stations and in the special hospitals at home and overseas, the hospitals being, it is true, limited to places where Air Force personnel are concentrated in large numbers or where no naval or military hospital is near. The sanitation of camps and barracks, the training of medical personnel for duties in peace and war, and the like can only be performed by medical officers who have an intimate knowledge of the organization and regulations of the force itself."

Mr. T. J. Underhill, technical examining officer to the Admiralty, writing in the *Journal of the Royal Naval Medical Service* for October, 1922, reviews the progress of the preservation of food from the time of the discovery of the first successful method until the present time. The use of preserved foods has become so universal that we have lost sight of the historical facts bearing on the subject.

During the early period of the nineteenth century Napoleon was ravaging Europe with his armies with the one object of obtaining world domination, but he recognized after his enormous efforts that unless the British Empire was brought under his subjection his life's desire would be a failure. He attempted a blockade of the ports of Europe, with a view to attacking British merchandise and thus crippling the commerce of Great Britain. The commerce of the world was very materially affected by this blockade, and naturally the food supplies of Europe were jeopardized. The French Government offered a prize of 12,000 francs to any person who could devise a system for the preservation of food so that supplies could, to a large extent, be conserved. The system, devised by M. Appert, was successful, and in 1810 he was awarded the prize by the Board of Arts and Manufactures of Paris. M. Appert's method of food preservation indirectly formed the basis on which the world's enormous food industries to-day are more or less carried out.

Although the credit for the discovery of food preservation by means of sealed receptacles was given to M. Appert, in 1807 the English Society of Arts awarded a prize to a Mr. Saddington for a method of preserving fruits "without sugar for house or sea stores," and this method was practically identical with that put forward by Appert, glass vessels being used.

Some authorities give the credit for the process of preserving foods by canning in its present form to Pierre Antoine Angelbert in 1823, but there is in existence an original price list dated 1817, issued by a London firm named Messrs. Donkin, Hall & Gamble, who were then practically engaged in producing tinned foods, which were well spoken of. In spite of the fact that the food of the British fleets at that period was so lacking in variety and of such doubtful quality that the enormous death rate from scurvy was more or less attributed to this cause, preserved tinned foods, although obtainable, were not

supplied as a ration, possibly owing to their high cost, and it was not until 1831 that they were issued—and then only as a medical comfort.

In 1846, preserved boiled beef was issued as a ration in the British Navy and was purchased in very large quantities from a Mr. Goldner, who had factories in London and at Galatz in Rumania. After a few years, owing to frequent complaints respecting the quality of this product, and the fact that undesirable portions of the animal were frequently found in the tins, the issue became unpopular and practically ceased. The British Government appointed a powerful committee in 1852 to investigate thoroughly the supply of meat provisions for use in the Navy; this, of course, included not only preserved tinned foods but salt beef and pork also. The evidence placed before the committee was of a most interesting character, practically all of the manufacturers at that period being called upon to give their evidence.

Among those called was a Mr. Danger, a London and Australian merchant, the first man to manufacture preserved meat in Australia in 1848, but the industry had so little support that it could not be kept on. His factory was at Newcastle, New South Wales. A few points of interest that were brought out at the inquiry referred to were as follows: (1) One of the main causes of the meat being unpalatable or unsound was the fact that tins containing as much as 14 to 16 pounds were contracted for and produced. It was found more or less impossible to sterilize properly such large tins and in those tins where the meat was sterile it was much too overcooked on the outside and became an unpalatable innutritious mass; (2) it was proved that many of the tins opened contained portions of the intestines of the animals and it was on account of complaints of this nature that the inquiry was instituted. The cause of this serious departure from recognized procedure was found to be due to the fact that the employees of Mr. Goldner were disaffected, owing to the low wages received by them and the generally bad treatment to which they were subjected, and they adopted this method as a form of revenge on their employer. It will be noted that one of the complaints made in the Crimean War was that the ration of tinned meat issued was found to be inedible for a similar cause, and this, no doubt, was obtained from the same source. The preserved tinned meat was much appreciated when supplied in tins not larger than 6 pounds and was both more palatable and much more nutritious than the old salt junk beef. The latter article was referred to by Doctor Ure, in the edition of his work on 'Arts, Manufactures and Mines of 1853,' as an article issued to the British Navy as food, upon the same principle as that ascribed to alligators, who swallow stones to appease the cravings of an empty stomach. There were several well-known packing houses in the middle of the nineteenth century, some such as Moir (still in existence), who produced excellent pre-

serves, but owing to the failure, more or less, of the supplies made by Goldner, they did not find favor to any extent, and the issues became reduced.

"In 1866, it was decided by the Admiralty to undertake the preservation of meat in the Royal Victualling Establishment at Deptford. The necessary plant was purchased and the work undertaken by Mr. Hogarth, one of the members of the then well-known firm of Messrs. Hogarth Bros., of Aberdeen. The issue of this boiled beef was made in 1867, but, although an excellent product, it did not readily find favor. The term applied to it at that time and since, by the British bluejacket, was 'Fanny Adams.'"

This peculiar appellation was derived from the fact that just prior to the issue of this meat a woman of that name had been murdered and cut up, the sailors of the fleet readily seizing upon her name to designate their new food product.

The preservation of tinned meat by the British Government at Deptford ceased in 1871 and from that time purchases have been made in the open market of meat produced either in Australia, New Zealand, or North and South America. The preservation of meat on a large scale in Chicago did not commence until 1877. These products, particularly those of certain Australian and American brands, "have always given satisfaction and practically no complaints have come to hand."

An efficient anopheline larvacide has been found in Paris green in the proportion of 1 per cent mixed with ordinary road dust and thrown by hand over breeding areas, the operator standing to windward and relying upon the breeze to spread the mixture. Two teaspoonfuls of Paris green mixed with 25 ounces of dust will control 1,000 square feet of breeding surface at the cost of 1 cent. The application should be repeated at intervals of 10 days. The operator should wear gloves. The mixture is harmless to vegetation and does not poison cattle.

From a number of abstracts from recent medical and public health papers issued by the Division of Venereal Diseases, United States Public Health Service, we quote the following as of interest to naval medical officers:

Arsphenamine derivative suitable for subcutaneous administration.—A derivative of arsphenamine, prepared from arsphenamine, formaldehyde, and sodium sulphite, has been studied experimentally. (The French trade name for the preparation is sulfarsenol.) The following conclusions have been reached:

1. The drug appears to be well suited for clinical use on account of the great solubility in water, the stability of the solutions in the presence of air, and the absence of any local irritation following its subcutaneous injection.

2. The toxicity of the drug is about the same as that of an average commercial preparation of neoarsphenamine.

3. Trypanocidal power of the two lots tested is slightly less, weight per weight, than that of the average neoarsphenamine.

4. The rate of excretion of the arsenic of the drug is of the same order as that of arsphenamine and neoarsphenamine. (Carl Voegtlin, Helen Dyer, and J. W. Thompson, *American Journal of Syphilis*, July, 1922.)

Diagnosis of early syphilis.—From the section on dermatology and syphilology, Mayo Clinic and the Mayo Foundation.

A study of 231 cases of early syphilis, largely untreated, yields the following observations bearing on the diagnosis of early stages of the disease:

1. The diagnosis of early syphilis has become a laboratory problem, divided between the dark field examination and the Wassermann reaction. Clinical criteria, while interesting, have lost most of their final diagnostic value. The primary stage especially should no longer be overemphasized in teaching.

2. The dark field examination showed 55 to 65 per cent of all genital lesions to be chancres outright.

3. In our consecutive series, irrespective of age, 66 per cent yielded positive dark fields; 80 per cent were positive the first week and none were positive after the ninth week.

4. Seventy per cent of the Wassermann tests made in the second week of the chancre were positive.

5. The dark field detected spirochete pallida in 23 of the 24 moist secondary lesions, and in 5 of 7 Wassermann negative, early, or recurrent secondary cases.

6. The dark field on treated primary lesions is not hopeless. Eleven of 17 cases yielded positives. None the less the withholding of treatment until after repeated negative dark field examinations needs to be vigorously preached.

7. Glandular aspiration of the satellite bubo of the chancre with dark field examination of the serum yielded 50 per cent positives.

8. Of 80 patients who previously had seen physicians, we found that only 3 had had dark field examinations, 1 Army man, 1 Navy man, and 1 civilian.

9. The practitioner's margin of error in diagnosis was 30 per cent. In 24 per cent treatment of some kind had been instituted, while no diagnosis had been given the patient.

10. "Chancroid" is still the chief diagnostic pitfall. The attitude that every genital lesion is potentially a chancre until proved otherwise is the safest for public and patient. Diagnosis of chancroid should not be made until four months after the appearance of the lesion and following repeated negative Wassermann tests. "Cancer,"

"tumor," "herpes," "felon" are the masquerades of extragenital chancres.

11. One patient had been used as a transfusion donor before coming to the clinic, while he had a chancre, and was at the height of his spirochetemia, and 10 days before his secondary eruption appeared. The physician who used him as a donor had evidently made no inquiry into his condition.

12. The Wassermann test in our secondary cases yielded the following: 92 per cent positive in treated and untreated; 95.7 per cent positive in those with slight treatment, 98.5 per cent positive in those without treatment.

13. We believe the repeated positive Wassermann test in secondary syphilis is a safer guide for the inexperienced than the characteristics of the eruption. If it is negative, the dark field or the combination of findings may make the diagnosis.

14. In the aggregate 24 per cent of patients with florid secondary syphilis a high percentage could give no history of chancre, even though their secondaries were fully developed. This included a physician with secondaries, but no sign of a primary lesion (needle prick?)

15. Women are especially apt to give no sign of a primary lesion (concealed, short duration, and so forth).

16. Macular eruptions preponderate in our secondary cases. This we believe is an effect of special attention to lighting on our part, and is of great importance where inspection is used as a clue to syphilis as in industrial and military hygiene.

17. More than half of our patients had infectious lesions when seen (68 per cent). More women than men had infectious lesions (75 per cent in contrast to 64 per cent), which makes them even more effective carriers than men. In this we are in accord with Fournier.

18. Half of our patients had constitutional symptoms with secondary irruptions; much fewer in the pruruptive stage (4 in 28).

19. Women show a markedly greater tendency to constitutional symptoms than men (63 per cent in contrast to 43 per cent). In this also we are in accord with Fournier.

20. The leading constitutional symptoms are sore throat (53 per cent), headache, and head pain (31 per cent).

21. Combinations of mild fever, sweats, loss of weight, asthenia, gastro-intestinal symptoms nervous irritability, arthritic and myalgic pains with anemia are frequent and are easily confused with early tuberculosis. They justify a routine Wassermann test when tuberculosis is suspected, especially in early adult and middle life.

22. Myalgia, arthralgia, and bone pain are easily confused with "rheumatism." The traditional nocturnal character is not a safe guide to syphilis, and is often absent. (John H. Stokes and Albert R. McFarland, American Journal of Syphilis, July, 1922.)

DIGEST OF DECISIONS.

The following correspondence is of interest in relation to the question of origin not in the line of duty, but not due to misconduct.

DEPARTMENT OF THE NAVY,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, 17 October 1922.

From: Judge Advocate General.

To: The Chief of the Bureau of Medicine and Surgery.

Subject: Entry in medical record for disease incurred prior to August 29, 1916, or disease or injury incurred prior to July 1, 1918, or prior to enlistment.

Reference: Your letter of October 2, 1922 (PR&R-260886-753991, RA/LJT).

1. In reference you present the cases of Paul K. Cederborg, Ex-RM3c., U. S. Navy, and Wilfred Alfred Ostiguy, seaman-2c., U. S. Navy, as examples, and request to be advised concerning the proper entry to be made in a medical record under the following conditions:

"(a) Should an entry to the sick list for a venereal disease acquired prior to entry into the naval service, or a disease the result of a venereal infection acquired prior to entry into the naval service, be entered on the health record as 'Misconduct' or 'Not misconduct'?

"(b) Should an entry to the sick list for a disease or injury the result of the use of drugs, alcoholic liquors, or other misconduct prior to entry into the naval service be entered on the health record as 'Misconduct' or 'Not misconduct'?

"(c) A patient is admitted to the sick list subsequent to August 29, 1916, for a disease that is due to the use of drugs, alcoholic liquors, or other misconduct in the service prior to August 29, 1916.

"A patient is admitted to the sick list subsequent to July 1, 1918, for an injury, or the result of an injury, that is due to the use of drugs, alcoholic liquors, or other misconduct in the service prior to July 1, 1918.

"Should an entry in the health record under the above conditions be 'Misconduct' or 'Not misconduct'?"

2. The questions presented arise primarily under the following provisions of the act of August 29, 1916 (39 Stat. 580):

"Hereafter no officer or enlisted man in the Navy or Marine Corps in active service who shall be absent from duty on account of sickness or disease resulting from his own intemperate use of drugs or alcoholic liquors, or other misconduct, shall receive pay for the period of such absence, the time so absent and the cause thereof to be ascertained under such procedure and regulations as may be prescribed by the Secretary of the Navy: *Provided*, That an enlistment shall not be regarded as complete until the enlisted man shall have made good any time in excess of one day lost on account of sickness or disease resulting from his own intemperate use of drugs or alcoholic liquors or other misconduct."

The foregoing provisions of the act of August 29, 1916, were amended by the act of July 1, 1918 (40 Stat. 717), by including therein any "injury" resulting from his own intemperate use of drugs or alcoholic liquors or other misconduct.

8. While officers and enlisted men of the Navy were subject to trial and sentence by courts-martial prior to the enactment of the laws above referred to for misconduct incurred in the naval service, they were not subject to courts-martial or other disciplinary action on account of sickness or disease or injury resulting from intemperate use of drugs or alcoholic liquors, or other misconduct, prior thereto. Subsequent to the enactment of these laws, however, provisions were inserted in the war risk insurance act of October 6, 1917, Veterans' Bureau act of August 9, 1921, and insomuch of the act of June 4, 1920, as provides for "death gratuity benefits," each of these acts providing that no benefits shall be derived therefrom by individuals whose injury or death is due to his own misconduct.

4. That individuals in the naval service are not subject to the jurisdiction of naval courts-martial or to disciplinary action by the Navy Department for misconduct as civilians prior to their entrance into the naval service is too well understood by the naval service to require further consideration in this connection. That individuals in the naval service who have incurred sickness or disease due to the intemperate use of drugs or alcoholic liquors, or other misconduct, prior to August 29, 1916, may not be held, under the provisions of said act, to have incurred the disability or disease complained of due to misconduct follows with equal force for the reason that to hold otherwise would be to render said act ex post facto and therefore unconstitutional. In other words, an act of this character can apply only to disease or disability incurred by the use of drugs or alcoholic liquors or other misconduct subsequent to its enactment (*Bolles v. Outing Co.*, 175 U. S. 262). This conclusion is further supported by the case of *Kring v. Missouri* (107 U. S. 221), in which the court held that no one can be criminally punished in this country except according to a law prescribed for his government by the sovereign authority before the imputed offense was committed and which existed as the law at that time.

5. The foregoing applies with equal force to those cases of injury resulting from the intemperate use of drugs or alcoholic liquors or other misconduct prior to July 1, 1918.

6. Since the provisions of the acts of August 29, 1916, and July 1, 1918, above referred to, apply only to individuals in the naval service who have incurred sickness or disease or injury due to intemperate use of drugs or alcoholic liquors or other misconduct subsequent to their enlistment in the naval service, in all cases where the sickness, disease, or injury is due to the intemperate use of drugs or alcoholic liquors or other misconduct prior to enlistment in the naval service it must be held to have been incurred "not in the line of duty; not due to his own misconduct." The same holding applies to those cases where the disease or disability due to misconduct was incurred in the naval service prior to August 29, 1916, or incurred subsequent to that date, but due to the intemperate use of drugs or alcoholic liquors or other misconduct prior to August 29, 1916; they must be held to have incurred the said disability "not in line of duty; not due to his own misconduct." The same applies to injuries occurring prior to July 1, 1918, or subsequent to that date, due to intemperate use of drugs or alcoholic liquors or other misconduct prior to July 1, 1918.

7. The provisions of the war risk insurance act, as amended by the Veterans' Bureau act of August 9, 1921 (42 Stat. 153), and the provisions of the act of June 4, 1920 (41 Stat. 824), relative to "death gratuity benefits," not being penal in character will, in the opinion of this office, be satisfied by a

holding of "not line of duty; not due to his own misconduct" under the same conditions as said holding is warranted under the provisions of the acts of August 29, 1916, and July 1, 1918, hereinbefore referred to.

8. Replying more specifically to the cases presented you are advised that in the opinion of this office the disability incurred by Wilfred Albert Ostiguy, seaman-2c., U. S. Navy, did not originate in the line of duty, but is not the result of his own misconduct for the reason that it existed prior to his enlistment in the naval service. The same holding applies to the case of Paul K. Cederberg, Ex.-RM3c., for the same reason.

9. Replying to the propositions presented you are advised:

(a) That an entry to the sick list for a disease acquired by misconduct prior to entry into the naval service, or a disease the result of a disease acquired through misconduct prior to entry into the naval service, should be held to have originated "not in the line of duty, but not due to his own misconduct."

(b) That an entry to the sick list for a disease or injury the result of the use of drugs, alcoholic liquors, or other misconduct prior to entry into the naval service should be held to have originated "not in the line of duty, but not due to his own misconduct."

(c) That an entry to the sick list subsequent to August 29, 1916, for a disease due to the use of drugs, alcoholic liquors, or other misconduct in the naval service prior to August 29, 1916, should be held to have originated "not in the line of duty, but not due to his own misconduct."

That an entry to the sick list subsequent to July 1, 1918, for an injury or a disability the result of an injury that is due to the use of drugs, alcoholic liquors, and other misconduct in the service prior to July 1, 1918, should be held to have originated "not in the line of duty, but not due to his own misconduct."

(Sgd.) J. L. LATIMER.

Approved, 17 October, 1922.

(Sgd.) EDWIN DENBY,
Secretary of the Navy.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.

(For review.)

Books received for review will be returned in the absence of directions to the contrary.

"Self-centered, self-taught, the physician leads a solitary life, and unless his everyday experience is controlled by careful reading it soon ceases to be of the slightest value and becomes a mere accretion of isolated facts, without correlation."

BRAIN ABSCESS, ITS SURGICAL PATHOLOGY AND OPERATIVE TECHNIC, by Wells P. Eagleton, M. D., medical director, Newark Eye and Ear Infirmary, Newark, N. J., chief of the division of head surgery, Newark City Hospital; formerly president of the American Otological Society. The Macmillan Co., New York, 1922.

As the writer informs us, this work "is the result of considerable intradural experience, associated with many disappointments and failures; some animal experimentation; and of observations during post-mortem examination of cases in which death had resulted from varied intracranial lesions." In it he has attempted very successfully to correlate the surgical treatment of the different pathological lesions associated with brain abscess.

In presenting the surgical procedures relative to the subject the author discusses some steps which his experience has shown to be useful, but in the main he relies on the technic first devised by Harvey Cushing, whose genius has transformed nonsuppurative intracranial surgery into a comparatively safe procedure.

The volume is composed of three parts in the first of which some general considerations of intracranial surgery, such as the preparation of the patient for operation and the general surgical technic of intracranial operations, are presented.

The second part is devoted to the surgical pathology and operative technic of brain abscess in detail, while in the third part the author considers the surgical diagnosis of intracranial suppuration.

An excellent guide for conducting a detailed neurological examination when brain abscess is suspected and an analysis of the pathological condition reported in 265 cases of cerebellar and frontal lobe abscesses are appended.

Surgically considered, intracranial abscess stands in a class by itself, the problems presented in its surgical treatment differing from those of suppuration in other parts of the body, and distinct from those encountered in the treatment of nonsuppurative lesions of the brain. As the author has treated the subject ably and extensively, this volume will be welcomed by all interested in this highly specialized branch of surgery.

THE ELEMENTS OF SCIENTIFIC PSYCHOLOGY, by *Knight Dunlap, professor of experimental psychology in the Johns Hopkins University.* C. V. Mosby Co., St. Louis, 1922.

This book was written with a view to introducing the reader to the modern science of psychology, which, as the author says, "is a science of the conscious responses of the organism, and as such is called upon to furnish materials applicable to the problems of physical science, education, industry, and the arts, and to social problems." It deals with the general problems of psychology only, and omits discussion of the special topics of child, animal, social, and abnormal psychology; of sleep and dreams; and of the application of psychology to education and the arts and industries. Although dealing with the foundations of modern psychology and not with applications, the work represents "the general point of view on which rests the psychology which is being applied in the fields of education, industry, and the arts, and which will undoubtedly be applied to medicine before long."

PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE, by *J. J. R. Macleod, M. B., professor of physiology in the University of Toronto.* Fourth edition. C. V. Mosby Co., St. Louis, 1922.

At the time when the first edition of this work appeared, in 1918, notwithstanding the large number of excellent textbooks in physiology available to the medical student, there were none in which particular emphasis was laid upon the application of the subject in the routine practice of medicine and, so far as the reviewer is aware, with the exception of the volume under consideration, none exists today.

In this book the author attempts to meet such a want by reviewing those portions of physiology and biochemistry which experience has

shown to be of special value to the clinical investigator. As the author says in the preface, "the work is not intended to be a substitute for the regular textbooks in physiology, or for those in functional pathology. It is supplementary to such volumes. It does not start like the modern text in functional pathology, with a consideration of the diseased condition, and then proceed to analyze the possible causes and consequences of the disturbances of function which this exhibits; but it deals with the present-day knowledge of human physiology in so far as this can be used in a general way to advance the understanding of disease."

In the preparation of the latest edition the author has revised each chapter so as to incorporate that which has been added to physiological knowledge during the past two years. Extensive additions have been made to the chapters on the output of the heart, the conditions causing alterations in the acid base equilibrium of the blood, the normal electrocardiogram, and the movements and emptying of the stomach.

BRONCHOSCOPY AND ESOPHAGOSCOPY, A MANUAL OF PERORAL ENDOSCOPY AND LARYNGEAL SURGERY, by *Chevalier Jackson, M. D., F. A. C. S., professor of laryngology, Jefferson Medical College; professor of bronchoscopy and esophagology, University of Pennsylvania.* W. B. Saunders Co., Philadelphia, 1922.

As stated in the preface, this book is based on an abstract of the author's larger work, *Peroral Endoscopy and Laryngeal Surgery*. In it the author has endeavored to present by written word the various purely manual endoscopic procedures—necessary in the modern treatment of conditions arising in the lower air and food passages.

As might be expected, much space is devoted to the instruments employed, the anatomy of the larynx, trachea, bronchi, and esophagus considered from an endoscopic viewpoint, the preparation and position of the patient, the introduction of the various special instruments, and the removal of foreign bodies. Several chapters are devoted to the examination and treatment of benign and malignant growths of the lower air and food passages, and to certain diseases of the larynx, trachea and bronchi, esophagus, and stomach about which endoscopic examination has recently thrown a new light.

Although tracheotomy is one of the oldest operations known to surgery, it is probably more often improperly performed to-day than any other operation. For this reason the author has included an excellently written chapter on this procedure.

As the writer of this volume is an authority on the subject, the book will be welcomed by surgeons desiring to acquire endoscopic skill, which, as the author remarks, can not be bought with the instruments.

REGIONAL ANESTHESIA, by *Gaston Labat, M. D., lecturer on regional anesthesia at the New York University.* W. B. Saunders Co., Philadelphia, 1922.

The development and progress of regional anesthesia have been slow, principally, as Dr. William J. Mayo says, "because the anesthesiologist must have an accurate knowledge of anatomy and a high degree of technical skill in order that the anesthesia may be safe and satisfactory and the operation not delayed." But it is certain that regional anesthesia has become a permanent aid to surgery either when employed alone or in combination with the use of general anesthesia. The modern surgeon must be prepared to use regional anesthesia, or the proper combination of anesthetics, in the individual case, and this book has been written for the purpose of affording the reader an opportunity of acquiring a practical knowledge of the subject and of teaching him how to use regional anesthesia successfully.

ANIMAL PARASITES AND HUMAN DISEASE, by *Asa C. Chandler, M. S., Ph. D., instructor in biology, Rice Institute, Houston, Tex.* Second edition. John Wiley and Sons. New York, 1922.

This carefully written volume is not intended for the edification of the biologist or the practitioner of medicine who has kept abreast of the times, but rather for the enlightenment of the general public. "Popular ignorance of parasitic diseases, even such common ones as malaria and syphilis, is nothing short of appalling," says the author; so in an ably executed attempt to contribute his "bit" toward the education of the masses in preventive medicine he has told the story of the animal parasites and their relation to human disease in a delightfully agreeable manner.

DISEASES OF WOMEN, by *Harry Sturges Crossen, M. D., F. A. C. S., clinical professor of gynecology, Washington University Medical School, and gynecologist in chief to the Barnes Hospital and the Washington University Dispensary.* Fifth edition. C. V. Mosby Co., St. Louis, 1922.

This is a clear and systematic treatise on the diagnosis and treatment of the diseases of women as those diseases are met with in the consulting room and at the bedside by the general practitioner. In it the author has presented in detail the basic facts and principles of gynecology—the anatomic, pathologic, diagnostic, and therapeutic information underlying successful gynecologic work. In the preparation of the new edition the work has undergone extensive revision, bringing all subjects up to date. Much space has been devoted to the important advances in X-ray and radium therapy, in their relation to malignant disease, uterine myoma, and other pelvic conditions. Recent developments in X-ray diagnosis have been considered at length. The work is amply illustrated by photographic illustrations, diagrams, and photomicrographs.

The methods of diagnosis and treatment indicated in the various gynecologic conditions are so clearly presented that this work can be unhesitatingly recommended to all medical officers who are interested in this special branch of surgery.

PHYSICAL DIAGNOSIS, by W. D. Rose, M. D., lecturer on *physical diagnosis and associate professor of medicine in the University of Arkansas*. Third edition. C. V. Mosby Co., St. Louis, 1922.

The issue of three editions of this work since 1917 testifies as to its popularity among "the medical students and busy practitioners" of the Middle West, for whom the book was primarily written. In this book we find the principles of physical diagnosis and the physical findings in the commoner diseases, especially of the circulatory and respiratory systems, adequately presented.

It contains a chapter on radiographic diagnosis written by Dr. Dudley E. Mackey, of New York, and a chapter on the diagnosis of abnormalities of the heartbeat by Dr. Drew Luten, of St. Louis.

Our knowledge of the circulatory organs has increased in recent years, and it is pleasing to note that the section dealing with this subject is up to date.

It is regrettable that the author has not devoted more space to the examination of the nervous system, as all "busy practitioners" encounter nervous diseases of which they are expected to possess more or less knowledge.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

PREVENTIVE DENTISTRY.

By GEORGE H. REED, Lieutenant Commander, Dental Corps, United States Navy.

In recent articles dealing with preventive dentistry more space has been used in the description of existing conditions as a result of the neglect of the teeth than has been devoted to methods designed to prevent these conditions. The principal value of these articles is to give additional evidence of the necessity for preventive dentistry. As intelligent application of the principles of preventive dentistry should begin at birth, the preponderance of literature on this subject is devoted principally to methods employed in the care of children's teeth. Not a great deal of information is available concerning methods which may be undertaken in adult life to prevent or retard the degeneration of tooth tissue, or to inhibit faults existing by reason of the lack of information of the basic tenets of preventive dentistry which has existed in the past.

The purpose of this article is to enumerate briefly a few practical suggestions which may be found of value to officers and men in the naval service in preserving dental efficiency by preventing recurrent decay. The suggestions offered are based on the supposition that every officer and man in the service is interested in maintaining his physical health, and that the relation of good teeth to health is understood and unquestioned.

As the subject matter of this paper chiefly concerns methods to be employed by other than dental surgeons, it will be valueless unless the suggestions, supplemented by the reasons for making the same, are considered by the dental officers themselves, and, if found worthy, communicated to the men. To make preventive dentistry of practical value to the men, and of military value to the service, it has been found advisable for the dental officer to lecture on this subject occasionally, and the time devoted to these lectures will be well spent,

and the effects, while not at once apparent, will be eventually seen. In these lectures an initial statement that all food passes through the mouth on its way to the stomach, and that if cavities exist in the teeth the bacteria-laden and decayed material present in these cavities is of a necessity mixed with the food and carried to the stomach, is generally sufficient to convince the layman of the reasonableness of the assumption that good teeth and good health are related. This can be supplemented by further technical explanations based on the probability of systemic infection from dental foci, etc., which are well understood by those trained in the art and science of medicine and dentistry, but not so easily comprehended by the enlisted men. The success or failure of lectures to stimulate interest in preventive dentistry will be in direct ratio to the earnestness exhibited by the instructor and his ability to present his ideas to the men in words easily understood. Such lectures may well be illustrated by examples found in the environment to which the men are accustomed.

As nearly 100 per cent of the men entering the Navy possess some dental defects, all men should be urged to visit the dental surgeon as soon after enlistment as possible. If a dental examination reveals cavities, these cavities should be filled as soon as practicable. When necessary, teeth should be X-rayed, and those which can not be saved should be extracted immediately. Other oral defects, such as inflammatory conditions of the mucous surfaces, should be corrected by proper treatment. After all faulty conditions are rectified the man should be instructed in proper methods to prevent oral sepsis. This point is too often neglected by both physicians and dentists in treating their patients.

The question of whether or not missing teeth should be supplied appears to offer a field for discussion. In an article published in the *Journal of the Royal Naval Medical Service* by Surg. Commander D. H. C. Given, Royal Navy, the writer states that a denture undoubtedly militates against true oral asepsis, and is a source of danger to the remaining teeth. He also states that fear of getting these dentures broken or knocked out is always a serious handicap and in a way is indirectly a menace to physical fitness and service efficiency. The writer further states that it would appear desirable in many instances to forego the wearing of small dentures, observing that mouths, otherwise healthy, are frequently rendered unhealthy by their mere presence, and therefore the aim should be to maintain dental efficiency without recourse to the use of dentures.

The arguments in favor of having missing teeth supplied by bridges or dentures are too well known to need comment.

The improper use of the toothbrush does more harm than good. Gum recession and its attendant evils may result from its improper

use. The custom of cleaning the gum tissues with the toothbrush when cleaning the teeth I have heard advocated as a means of stimulation and hardening the gum tissue, but I do not agree with this procedure. It is unnecessary to explain the deleterious effects which may ensue from the practice of cleaning the gums with a toothbrush which has not been properly sterilized. The possibility of direct infection is quite evident.

A toothbrush may be sterilized in many ways. An excellent method is as follows:

To a tumbler of warm water 2 teaspoonsful of table salt are added, and into this the toothbrush is dipped and allowed to remain a short time. It is then taken out and permitted to dry. The evaporation of the water will leave the salt crystals attached to the bristles of the brush and serve as a sterilizing agent until it is next used.

In an article published by the Massachusetts Board of Health and written by the dean of Tufts College Dental School the author states: "As the result of experiments to determine the most hygienic method of caring for the brush the writer has found that a brush rinsed in water after using and then placed in a closed receptacle developed many more bacteria than one which was rinsed in hot water and left in the air to dry. It is therefore advised that the brush be thoroughly rinsed in hot water after each use. The brush should be freed from water as much as possible by shaking and then hung in a place protected from the dust." This latter method is commonly employed as the one requiring the least effort. While not as satisfactory as the first method, it is better than hanging up the brush without giving it any attention whatever.

The importance of thorough mastication of the food can not be too greatly stressed. It stimulates the flow of saliva, and is an important factor not only in the preservation of dental efficiency but in maintaining physical health. The rôle played by the saliva is an important one, and its constant renewal maintains the normal environment of the teeth and prevents the harmful action of fermentation by its neutralizing effects. Thorough mastication increases the salts of the saliva, giving alkaline reaction in proportion to their presence. Prinz states that "quality of secreted saliva is the sole factor which governs environmental phenomena concerning tooth decay."

Probably nothing could be done which would be of greater value as a means of preventing dental degeneration than the eating of the proper quantity of coarse hard food. Pages have been written concerning the deleterious effect of modern diet on dental efficiency. Soft-cooked foods that do not require much mastication tend to deprive the teeth of the service for which they were intended. It is well known that anything not used tends to atrophy.

Dental decay in the teeth of wild animals is held to be rare. Decay in the teeth of domestic animals used as pets is not so rare, and the reason for this can be usually traced to the food.

The effect of the modern diet on teeth can be perhaps better illustrated in the case of the Eskimo. It is only recently that the necessity for dental treatment of this race has been noted. Explorers in their accounts of visits to the far north have made frequent allusions in their writings to the excellent condition of the teeth of this hardy race where dental caries was practically unknown. Furthermore, it is asserted that the introduction of flour and other staples so much used in modern civilization has caused a noticeable change in this respect and dental decay is now increasingly prevalent.

Teeth having been deprived of their function by reason of the loss of other teeth, with which they occluded, are sometimes observed coated with calculus which slowly accumulates in defiance of the ordinary use of a toothbrush. Furthermore, teeth deprived of their function usually elongate and are exfoliated. While the advisability of removing these teeth or restoring their function is not considered at length in this article, the value of maintaining the function of other teeth by thorough mastication is evident.

The question of whether or not the frequent eating of sweets is of sufficient importance in itself to predispose to dental decay has furnished occasion for some discussion in the past. Newspaper readers may recall the recent challenge of a candy manufacturer, addressed to a prominent dentist, to furnish proof that candy eating is a cause of decay of the teeth. What resulted from this challenge is not known, as the reply to it has not been given the publicity afforded the challenge. The writer is of the opinion that a judicious use of sweets is not particularly harmful and that it is only an accessory cause predisposing to decay.

An apple or a pear eaten at the end of a meal is of considerable value in cleansing the teeth of particles of food, by stimulating the flow of saliva. Fruit as a dessert is much better for the teeth than the sweets in common use.

Men in the naval service have little choice in selecting their food, as it has been chosen for them; however, with care, there is sufficient variety for ordinary purposes. In general, the food of civilized races lacks coarseness and hardness. Coarse food is vastly more beneficial to the teeth than soft food, even if not so acceptable to the palate.

Milk increases the calcium content of the body and it is logical to assume that a deficiency of this calcium is one of the reasons for so-called chalky tooth structure. Milk contains vitamins A, B, and C necessary for a balanced diet which in connection with calcium and phosphate salts tends to harden bone as well as teeth.

Pickerill has demonstrated that teeth are porous when they first erupt or cut through the gums. After exposure to saliva, containing calcium phosphate in solution, the teeth become harder as a result of the saliva depositing calcium phosphate into minute interstices of the tooth structure.

It is known that the saliva contains both acid and alkaline salts which are incapable of neutralizing each other, but which are capable of neutralizing other acids or alkalies. Sometimes the saliva contains an excess of the acid salts and at other times an excess of alkaline salts. This is a field of great complexity and one in which much scientific work is being done.

Perhaps the solution of many of the problems of preventive dentistry is concealed in a better understanding of the function of the saliva both as a protective agent and as a means of supply deficiencies which render the teeth more susceptible to decay.

One final word concerning the cleaning of the teeth. The time to clean teeth is when they need cleaning, be it often or not so often. Only one rule can be made that will apply to all cases, i. e., to clean the teeth before turning in for the night. Cleanliness in teeth can not exist when the gums are soft, spongy, inflamed, bleeding, or sensitive, or when calculus and decayed teeth are present in the mouth. Calculus, or tarter, generally forms on bacterial plaques lodging on the teeth, and it is essential that these plaques be dissolved before retiring for the night so that they can not harden and become firmly attached to the enamel. Any of the well-known standard tooth powders will accomplish this if used thoroughly and regularly, and will prevent the tarnishing of gold crowns and bridges, beside being the greatest single factor in preventing pyorrhea alveolaris.

The prevention of pyorrhea, now referred to in dental literature as "periodontoclasia," is one of the most important single factors dentists have to consider in preventive dentistry. The absolute cure for this dental disease is yet to be discovered. It has no single causative organism that has yet been isolated, and dentists have been forced to conclude that the best way to combat this disease is to make every effort to prevent it. It is therefore a considerable factor in preventive dentistry. The methods in vogue for the treatment of advanced stages of periodontoclasia are many and varied, and are employed with varying degrees of success; but one thing is common to all treatments, and has been unquestionably demonstrated, that periodontoclasia is inhibited by prophylaxis. In other words, a clean mouth will do more to retard the progress of this disease, if not entirely prevent it, than any other single factor yet discovered.

HEALTH CONDITIONS OF THE NAVY.

The provisional morbidity rate for all causes, entire Navy, for the year 1922 was 583 per 1,000 per annum as compared with 625 per 1,000 per annum for 1921, 779 per 1,000 per annum for 1920, and 676 per 1,000 per annum for 1919. The annual admission rate for all causes, entire Navy, for the four-week period ending January 6, 1923, was 636 per 1,000; the admission rate for diseases only was 585 per 1,000 per annum, and for accidents and injuries 51 per 1,000 per annum.

The admission rate for communicable diseases, exclusive of influenza and venereal disease, was 45 per 1,000 per annum, which is far below the norm to be expected at this season of the year.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of December, 1922, in comparison with the mean annual admission rates, month of December, for the five-year period 1917-1921, inclusive:

	Decem- ber, 1917- 1921.	Decem- ber, 1922.
Cerebrospinal fever.....	2.96	0
Diphtheria.....	6.35	0
German measles.....	10.60	.41
Influenza.....	371.34	58.01
Malaria.....	41.18	10.59
Measles.....	32.91	.82
Mumps.....	17.45	1.65
Pneumonia.....	64.59	2.06
Scarlet fever.....	6.51	.51
Smallpox.....	.04	0
Tuberculosis, chronic pulmonary.....	12.14	2.16
Typhoid fever.....	.43	0

In the above table it will be noted that the morbidity rates for all communicable diseases are much lower for the month of December, 1922, than the average for the month of December for the previous five years. Particular attention is invited to the low morbidity rate for malaria, entire Navy—10.59 per 1,000 per annum.

Few communicable diseases have been reported from shore stations; however, there were 12 cases of scarlet fever reported from the United States Naval Training Station, San Francisco, Calif., during the month of December, 1922.

The provisional morbidity rate for the venereal diseases for the year 1922 was 118 per 1,000 per annum as compared with a rate of 120 per 1,000 per annum for 1921. By reference to the Surgeon General's report for the year 1922 it will be noted that there has been little

change in the annual rate for venereal disease during the past three years.

The provisional annual mortality rate for the Navy for the year 1922 was 3.38 per 1,000 as compared with 4.78 per 1,000 per annum for the year 1921.

VENEREAL DISEASE ON THE U. S. S. "NEVADA."

The following is a report of the venereal disease situation on the U. S. S. *Nevada* from September 5, 1922, the date of arrival in Rio de Janeiro, Brazil, to December 9, 1922, the date of arrival in the United States:

Number of prophylactic treatments administered while at Rio de Janeiro, Brazil, from September 5, to November 16, 1922, and venereal infections following prophylaxis.

Time after exposure.	Number of treatments.	Number of infections.			Total.	Per cent of infections following prophylaxis.
		Chan-croid.	Gono-coccus.	Syphi-lis.		
1 hour.....	463	10	3	0	13	2.81
2 hours.....	2,135	56	52	0	108	5.06
3 hours.....	945	30	31	1	62	6.56
4 hours.....	440	18	12	0	30	6.82
5 hours.....	61	0	2	1	3	4.92
6 hours.....	32	2	6	1	9	28.12
6 to 12 hours.....	12	1	0	0	1	8.33
Over 12 hours.....	13	0	0	0	0	0
Total.....	4,101	117	106	3	226	5.51

Number of infections developing among men who failed to take prophylaxis (same period):

Chancroid.....	35
Gonococcus infection of urethra.....	28
Syphilis.....	2
Total.....	65

The following table shows the approximate length of service of the 291 men who were infected:

From 1 to 3 months.....	34
From 3 to 6 months.....	23
From 6 to 12 months.....	11
From 12 to 24 months.....	73
From 24 to 48 months.....	111
Over 48 months.....	39
Total.....	291

Number of prophylactic treatments administered from January 1 to September 5, 1922, and venereal infections following prophylaxis.

Time after exposure.	Number of treatments.	Number of infections.			Total.	Percentage of infections following prophylaxis.
		Chan-croid.	Gono-coccus.	Syphi-lis.		
1 hour.....	247	0	0	0	0	0
2 hours.....	404	3	3	0	6	1.48
3 hours.....	429	0	11	0	11	2.56
4 hours.....	297	2	5	1	8	2.69
5 hours.....	191	1	10	1	12	6.28
6 hours.....	290	0	15	1	16	5.52
6 to 12 hours.....	252	2	8	0	10	3.97
Over 12 hours.....	9	0	1	0	1	11.11
Total.....	2,119	8	53	3	64	3.02

Number of infections developing among men who failed to take prophylaxis (same period) :

Chancroid.....	5
Gonococcus infection of urethra.....	16
Syphilis.....	3
Total.....	24

Number of men under treatment at present time for active venereal diseases :

Chancroid (probably syphilis).....	26
Gonococcus infection of urethra.....	18
Total.....	44

As will be seen by the large number of exposures, it is quite evident that alcohol and cheapness of prostitution accounted for the large percentage of venereal diseases. The price for sexual congress varied from 1 to 5 milreis. One milreis was worth 12 cents at the rate of exchange during the ship's stay at Rio.

In anticipation of the prevalence of venereal disease in Rio de Janeiro, the senior medical officer en route and after arrival at Rio de Janeiro warned the men by means of lectures of the dangers of illicit sexual congress and advised them to take every available precaution to prevent venereal infection. From this report it would appear that the warning fell upon barren soil. However, no one can say just how much worse it might have been had no warning been given.

The senior medical officer feels quite confident that the modification of General Order No. 29 by General Order No. 69, which no longer makes venereal prophylaxis compulsory and punishable for failure to take it on exposure, has been a cause for laxity in taking prophylaxis, thereby indirectly being a factor for the increased

prevalence of venereal infection. On every ship there is a certain percentage of the crew unwilling to follow advice, therefore rigid and explicit orders are necessary. This portion of the crew make up the larger part of the venereal list on every ship. There is another class of men who take prophylaxis at certain intervals, thinking that they are "putting one over" without realizing that they are fooling no one but themselves.

Prostitution in Rio de Janeiro is so disseminated that it would be practically impossible to restrict any certain district. The only real effective restriction would be to prohibit liberty altogether, which was considered inadvisable under the circumstances. However, liberty was restricted to 11 o'clock. Without this restriction venereal infection, no doubt, would have been greater. There is every reason to believe that men failed to avail themselves of ordinary cleanliness with soap and water immediately after sexual concourse as they were instructed to do. The failure to use this precaution certainly accounts for the large percentage of chancroidal infections.

Considering the length of time the ship lay at anchor in Rio de Janeiro, with liberty every day for half of the crew, the accessibility of alcoholic beverages, the type of prostitute and low cost of prostitution, and the lack of amusements for enlisted men, it is surprising that the percentage of venereal infection was not greater.

Attention is invited to the fact that the number of prophylactic treatments administered while in Rio de Janeiro is nearly twice the number of treatments administered for the preceding eight months. Comparing an equal number of exposures in the United States and Brazil, the rate of infection was 40 per cent greater in Rio de Janeiro than in the ports visited in the United States.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "WILMINGTON," FOR THE YEAR 1922.

During the year the general health of the crew has been good. The records show that eight cases of malaria occurred during the year. These were contracted while the ship was at Bombay and Karachi, India.

Until arrival in the United States, September 20, 1922, the venereal-disease rate was high, but since that time the admission for these diseases have rapidly decreased, and at the present time there are no men on the venereal restricted list. This is attributed to the fact that there are more opportunities for healthful recreation, and that intoxicants, narcotics, and opportunities for illicit sexual intercourse are less plentiful than in the foreign ports visited by this vessel.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "TACOMA,"
FOR THE YEAR 1922.**

Although the greater part of the year was spent cruising in the Tropics, there were no epidemics. In fact, tropical diseases were conspicuously absent.

There were 12 admissions and 9 readmissions for malaria. The malarial parasite was demonstrated in the peripheral circulation in the majority of the cases and invariably was found to be of the benign tertian form. Of the 12 admissions, 7 gave definite histories of previous infection during residence in one of the Southern States. Two cases were infected in Cuba, 2 in Panama, and 1 in Haiti.

There were 20 admissions for acute follicular tonsilitis and ulceromembranous angina. Most of these cases developed during the overhaul period while in the navy yard at Boston, Mass.

A disabling disorder which affords material for thought and scientific effort is the nonvenereal lymphadenitis so often met with in tropical countries. Six such cases developed during the cruise. While the equipment for carrying on research work aboard ship is rather limited, full advantage was taken of such apparatus and material as were available in an effort to determine the etiology of these cases. Even though no underlying cause was discovered, observation and study revealed that all the cases had been engaged in hard labor for at least 10 days prior to the development of the disorder. The systematic reactions were not in proportion to local conditions. Not one of the cases had a clear venereal history, but all admitted sexual intercourse with native women at some time previously. However, at the time of admission to the sick list no demonstrable evidence of venereal disease was apparent, nor were any of the usual causes present, for such an adenitis.

Two cases of pompholyx, of aggravated form, occurred among members of the crew. The condition in both instances progressed to the point of completely incapacitating the men affected. During the latter phases the disease could easily have been mistaken for either pellagra or eczema. The course of the disorder was of about six weeks' duration. The subjects were all below normal physically.

The venereal incidence was unduly high during a few months of the past year. After several weeks of intensive training, without liberty, at Guantanamo Bay, Cuba, the crew was granted its first liberty in Colon, Panama, where the men had free access to liquor. This factor had its usual influence on the venereal disease rate. Under such circumstances the enlisted men either do not use prophylaxis or resort to it after too long a time has elapsed for it to do any good. The relationship between alcohol and venereal disease is well established, and much might be accomplished if more stress were

laid upon this point in the educational propaganda launched in behalf of the enlisted personnel. If the men of our military organizations can not be induced to side-step these vices they should, at least, be thoroughly impressed with the necessity of indulging in them at separate times and by this means avoid the added danger and greater chance of infection brought about by such mixed debauchery.

The recent issue to the service of the prophylactic tubes is a step in the right direction. The instruction given aboard this vessel is to use the preparation before and after the act. The prophylactic tube has not been in use long enough for us to make a definite statement as to its efficacy, but suffice it to say that the self-administration of prophylaxis by means of the tube appears to be most satisfactory.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. NAVAL HOSPITAL, PENSACOLA, FLA., FOR THE YEAR 1922.

The health of the hospital personnel and of the station in general has been very good. There have been extremely few contagious diseases during the year. A rather extensive epidemic of dengue began in August, reached its peak in September, and gradually died out on the advent of cool weather and the disappearance of mosquitoes. This epidemic was not confined to the station but included the city of Pensacola and surrounding country. The disease was of a mild type, running its course in from five to seven days and showing characteristic symptoms. Altogether there were 174 cases treated at this hospital, including 7 original admissions.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.

RA/LJT 129733(93).

Serial No. 233-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 14, 1922.

To: All naval medical officers.

Subject: Discontinuing the use of a signed statement in the health records upon release or discharge, claiming or waiving claim for compensation under the war risk insurance act.

Reference: Paragraph D-8063, Bureau of Navigation Manual.

1. The Bureau of Medicine and Surgery was advised recently by the United States Veterans' Bureau that, in their opinion, the use of a signed statement in health records, claiming or waiving claim for compensation, was of no value in adjudicating claims for compensation or vocational rehabilitation, and in so far as the United States Veterans' Bureau was concerned its use could be discontinued.

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2. The Bureau of Navigation concurred in this opinion and has stated that " * * * change in Bureau of Navigation Manual will be issued to the service canceling this requirement."

3. In view of the above the use of a signed statement in the health record, claiming or waiving claim for compensation under the war risk insurance act, will be discontinued.

E. R. STITT.

Circular letter.
Serial No. 234-1922.

NLS-EGM F-4-42022
124482(123).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 16, 1922.

To: All medical officers, chief pharmacists, and pharmacists.

Subject: Preparation and forwarding of Form N. M. S. H. C. 4, Roster Report of the Hospital Corps.

Reference: (a) Bureau of Medicine and Surgery circular letter, serial number 14-20 of 4 March, 1920.

(b) Section 7, chapter 54, U. S. Navy Regulations, 1920.

1. Paragraph 1 of reference (a) is hereby canceled.
2. The Roster Report of the Hospital Corps will be forwarded in accordance with the instructions contained in reference (b) and on the face of the report.
3. When the last Saturday in a month immediately precedes or follows the last calendar day of a month, the monthly roster only shall be submitted by stations forwarding the report weekly.
4. On the face of the monthly roster shall be reported all receipts, transfers, enlistments, reenlistments, extensions of enlistment, discharges, desertions, deaths, changes of rate, and receipts as patients of Hospital Corps men occurring during the month reported. This is in addition to similar information reported weekly.
5. On the reverse of the monthly roster the names of Hospital Corps men who are patients received from other stations or ships, and who are en route to other stations or ships, shall be reported after the names of Hospital Corps men attached to the crew; Hospital Corps men attached to the crew who are on the sick list shall be shown in their usual alphabetic position as "On sick list." The diagnosis shall be given in all cases of men reported as patients or on sick list.

E. R. STITT.

Circular letter.
Serial No. 235-1922.

WSG 128014(124).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 30, 1922.

To: All Medical Department personnel.

Subject: Manual of the Medical Department, 1922.

Reference: Article 74, Navy Regulations, 1920.

1. The accompanying Manual of the Medical Department has been carefully prepared by revising the edition of 1917 and by bringing the subject matter down to date of October, 1922.
2. It is desired that errors and omissions be immediately reported, and that changes and additions be suggested from time to time.

3. In letters to the bureau reporting errors or making suggestions, the "Subject" should be stated as above, and reference should be made to the paragraph discussed as follows:

Paragraph 1481 (b), line 3.

E. R. STITT.

Circular letter.

HWS: MFD 124920(124).

Serial No. 236-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 30, 1922.

To: All medical officers.

Subject: Arsphenamine and neoarsphenamine.

References: (a) Circular letter 44-1920 of 10 July, 1920.

(b) Circular letter 208-1922 of 17 August, 1922.

(c) Report of a board, published in the U. S. NAVAL MEDICAL BULLETIN of November, 1922.

1. Reference (a) contains instructions to the effect that arsphenamine should be employed only at hospitals, and that neoarsphenamine exclusively be used elsewhere. Reference (b) repeated these instructions, amplifying them in certain details.

2. It has been brought to the attention of the bureau that reference (c) prescribes the use of articles of apparatus differing in some respects from those listed on the Supply Table; and further that in reference (c), which by reason of its source and the circumstance of its publication in the BULLETIN has something of the force of instructions, there appear statements concerning the choice of drugs that represent views apparently at variance with those prompting the issue of references (a) and (b).

3. Relative to items of apparatus, it is believed that articles now on the Supply Table can be made to fulfill all requirements, provided their use is governed by an understanding of the principles to be observed.

4. Relative to the choice of drugs, the bureau, recognizing the higher and more uniform therapeutic efficiency of arsphenamine and its greater stability, concurs fully in the conclusions of the board regarding the general desirability of employing it in preference to neoarsphenamine. Nevertheless, it is believed that the liability to accidents arising from the improper administration of arsphenamine is sufficiently great to justify restricting the use to institutions where adequate apparatus and materials are at hand.

5. While the undoubted lack of stability of neoarsphenamine constitutes a real objection to its use, particularly in low latitudes, the bureau is authoritatively informed that neoarsphenamine, as now prepared and tested before issue, can be administered safely without regard to time, temperature, or other conditions influencing stability, if the specimen used passes successfully the tests enumerated in reference (c).

6. Therefore the instructions contained in references (a) and (b) are re-affirmed, and extended as follows:

7. In view of the rather numerous instances reported in medical literature when one drug was mistaken for the other, and administered with correspondingly inappropriate technic, it is directed that hereafter only one of these two drugs be carried in stock, for purposes of administration, at any one place—i. e., at hospitals, arsphenamine alone will be carried; elsewhere, neoarsphenamine. Should there appear to be good reason for using either drug otherwise than as specified in this paragraph, the matter will be made the subject of a special letter to the bureau.

S. Hospitals having on hand stocks of neoursphenamine will return them to the nearest naval medical supply depot.

E. R. STITT.

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NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., 22 December, 1922.

Bureau of Navigation Circular Letter No. 66-22.

To: All ships and stations.

Subject: Advancement of hospital apprentices.

1. In order to establish a flow of promotion in the nonrated grades of the Hospital Corps, commanding officers of ships and stations are authorized, until further notice, to advance hospital apprentices, second class, to hospital apprentices, first class, in excess of allowed complement and without reference to the bureau. Men so advanced must have all qualifications required by Bureau of Navigation Manual.

2. The total number of hospital apprentices, second class, advanced in accordance with this authority shall not exceed in any command the total vacancies existing in the higher ratings of hospital corpsmen; that is, the total number of hospital corpsmen on board shall not exceed the total number authorized in complement.

(S.) THOMAS WASHINGTON.

VITAL STATISTICS.

In the future the "Monthly Health Index," which will be published on the fifteenth of each month, will contain statistical data for individual ships and shore stations. The statistics appearing in this bulletin are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{3}{28}$, $\frac{6}{31}$, or $\frac{3}{31}$, or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the month of December, 1922.*

	Entire Navy.	Forces afloat.	Forces ashore.	Marine Corps.
Average complement.....	116,667	73,367	43,300	21,025
All causes:				
Number of admissions.....	6,000	2,955	3,045	1,015
Annual rate per 1,000.....	617.10	483.32	843.86	579.30
Disease only:				
Number of admissions.....	5,416	2,640	2,776	931
Annual rate per 1,000.....	557.04	431.80	769.31	531.36
Communicable disease, exclusive of venereal disease:				
Number of admissions.....	893	434	459	184
Annual rate per 1,000.....	91.84	70.99	127.19	105.02
Venereal disease:				
Number of admissions.....	1,275	865	410	206
Annual rate per 1,000.....	131.13	141.48	113.62	117.57
Injuries and poisons:				
Number of admissions.....	584	315	269	84
Annual rate per 1,000.....	60.06	51.52	74.55	47.94

TABLE No. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of December, 1922.*

	Forces afloat, Navy and marines (complement), 73,367.		Forces ashore, Navy and marines (complement), 43,300.		Total (complement), 116,667.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases.....	2,640	431.80	2,776	769.31	5,416	557.04
Injuries and poisons.....	315	51.52	269	74.55	584	60.06
Total admissions.....	2,955	483.32	3,045	843.86	6,000	617.10
Class III:						
Appendicitis, acute.....	31	5.07	37	10.25	68	6.99
Autointoxication, intestinal.....	5	.82	12	3.33	17	1.75
Cholangitis, acute.....	14	2.29	11	3.05	25	2.57
Cholecystitis, acute.....	0	0	2	.55	2	.21
Cholelithiasis.....	1	.16	1	.28	2	.21
Colitis, acute.....	2	.33	1	.28	3	.31
Constipation.....	15	2.45	16	4.43	31	3.19
Enteritis, acute.....	10	1.64	19	5.27	29	2.98
Gastritis, acute catarrhal.....	9	1.47	5	1.39	14	1.44
Gastroenteritis.....	30	4.91	44	12.19	74	7.61
Hemorrhoids.....	26	4.25	24	6.65	50	5.14
Pharyngitis, acute.....	31	5.07	22	6.10	53	5.45
Ulcer of duodenum.....	1	.16	0	0	1	.10
Ulcer of stomach.....	2	.33	2	.55	4	.41
Total.....	177	28.95	196	54.31	373	38.36
Class VII:						
Varicocele.....	10	1.64	8	2.22	18	1.85
Class VIII:						
Chicken pox.....	6	.98	3	.83	9	.93
German measles.....	3	.49	1	.28	4	.41
Influenza.....	360	58.88	204	56.53	564	58.01
Measles.....	7	1.14	1	.28	8	.82
Mumps.....	6	.98	10	2.77	16	1.65
Pneumonia, broncho.....	1	.16	3	.83	4	.41
Pneumonia, lobar.....	10	1.64	12	3.33	22	2.26
Scarlet fever.....	0	0	5	1.39	5	.51
Total.....	393	64.28	239	66.23	632	65.00
Class IX:						
Dysentery, entamebic.....	2	.33	3	.83	5	.51
Class X:						
Dengue.....	25	4.09	105	29.10	130	13.37
Filariasis.....	1	.16	1	.28	2	.21
Malaria.....	5	.82	98	27.16	103	10.59
Total.....	31	5.07	204	56.53	235	24.17
Class XI:						
Tuberculosis (all forms).....	8	1.31	13	3.60	21	2.16
Class XII:						
Chaneroid.....	216	35.33	68	18.84	284	29.21
Gonococcus infection.....	592	96.83	268	74.27	860	88.45
Syphilis.....	57	9.32	74	20.51	131	13.47
Total.....	865	141.48	410	113.62	1,275	131.13
Class XVIII:						
Bronchitis, acute.....	213	34.84	356	98.66	569	58.52
Laryngitis, acute.....	3	.49	3	.83	6	.62
Pleurisy, acute fibrinous.....	9	1.47	4	1.11	13	1.34
Rhinitis, acute.....	11	1.80	39	10.81	50	5.14
Tonsillitis, acute follicular.....	220	35.98	237	65.68	457	47.00
Total.....	456	74.58	639	177.09	1,095	112.62
Class XX:						
Herniæ.....	24	3.93	25	6.93	49	5.04

TABLE No. 3.—*Summary of annual admission rates for venereal disease reported from ships for November and from various shore stations for the four-week period December 3 to December 30, 1922.*

	Average rate per 1,000, November.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	22.35	162.09	2,111.11	20.83	186.51	1,215.19
Battleship and cruiser force:						
Atlantic Fleet.....	10.57	127.53	427.30	65.57	154.68	368.23
Pacific Fleet.....	36.31	129.54	438.15	62.86	154.08	604.86
Asiatic Fleet.....	82.19	656.93	923.08	176.47	398.62	560.13
Destroyer force:						
Atlantic Fleet.....	0	201.11	1,209.30	27.71	183.37	639.59
Pacific Fleet.....	0	73.09	800.00	29.63	105.01	681.54
Asiatic Fleet.....	0	272.98	1,018.87	173.19	491.02	1,044.64
Miscellaneous:						
Atlantic Fleet.....	0	190.06	2,111.11	20.83	158.56	282.10
Pacific Fleet.....	0	114.69	654.54	21.90	129.04	591.24
Asiatic Fleet.....	0	445.84	1,440.00	94.24	547.69	1,215.19

	Annual rate per 1,000, Dec. 3 to Dec. 30, 1922.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States..	0	72.67	383.48	0	87.05	301.84
First naval district.....	29.61	73.15	157.25	22.42	67.58	301.84
Third naval district.....	33.73	64.62	109.06	13.71	100.56	226.38
Fourth naval district.....	20.44	207.76	383.48	26.05	252.46	271.25
Fifth naval district.....	24.76	78.28	198.97	29.63	84.81	258.60
Sixth naval district.....	0	30.06	37.23	49.32	46.98	110.42
Seventh naval district.....	0	0	0	0	0	0
Eighth naval district.....	86.66	119.54	126.38	88.00	126.66	129.28
Ninth naval district.....	41.11	41.11	41.11	98.58	98.58	98.58
Eleventh naval district.....	10.83	13.63	18.38	11.00	31.69	70.16
Twelfth naval district.....	63.52	81.08	90.13	66.51	113.68	126.00
Thirteenth naval district.....	0	32.55	102.36	0	42.54	140.62

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, November.		Per cent since July 1, 1922.	
	Gono-coccus.	Syphilis.	Gono-coccus.	Syphilis.
All ships.....	72.41	5.70	66.30	6.88
Battleship and cruiser force:				
Atlantic Fleet.....	67.59	3.70	66.77	7.64
Pacific Fleet.....	79.37	3.12	73.62	5.48
Asiatic Fleet.....	53.33	13.33	48.78	19.29
Destroyer force:				
Atlantic Fleet.....	72.81	5.82	74.94	5.33
Pacific Fleet.....	78.12	18.75	84.72	8.36
Asiatic Fleet.....	55.55	5.55	49.70	4.61
Miscellaneous force:				
Atlantic Fleet.....	75.00	.86	65.53	7.01
Pacific Fleet.....	80.64	16.12	73.54	11.91
Asiatic Fleet.....	74.64	4.22	56.65	4.64

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE—Continued.

	Per cent Dec. 3 to Dec. 30, 1922.		Per cent since July 1, 1922.	
	Gono- coccus.	Syphilis.	Gono- coccus.	Syphilis.
All naval districts in the United States.....	76.64	13.17	76.32	12.10
First naval district.....	86.95	4.34	33.47	7.82
Third naval district.....	84.61	0	77.77	11.11
Fourth naval district.....	80.95	9.52	85.92	5.52
Fifth naval district.....	64.40	27.11	67.91	17.14
Sixth naval district.....	100.00	0	68.51	5.55
Seventh naval district.....	0	0	0	0
Eighth naval district.....	50.00	25.00	70.58	9.80
Ninth naval district.....	100.00	0	97.36	0
Eleventh naval district.....	100.00	0	85.71	7.15
Twelfth naval district.....	83.33	3.33	78.26	15.94
Thirteenth naval district.....	100.00	0	86.66	6.67

TABLE NO. 4.—Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the four-week period, December 3 to December 30, 1922, inclusive.

Classes.	Navy (comple- ment), 95,642.		Marine Corps (com- plement), 21,025.		Total (comple- ment), 116,667.	
	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.
Diseases of blood.....	1	0.14	0	0	1	0.11
Diseases of circulatory system.....	53	7.20	5	3.09	58	6.46
Diseases of digestive system.....	439	59.67	114	70.49	553	61.62
Diseases of ductless glands and spleen.....	8	1.09	1	.62	9	1.00
Diseases of ear.....	65	8.83	12	7.42	77	8.58
Diseases of eye and adnexa.....	54	7.34	11	6.80	65	7.24
Diseases of genito-urinary system (nonve- neral).....	96	13.05	16	9.89	112	12.48
Communicable diseases transmissible by oral and nasal discharges.....	519	70.54	53	32.77	572	63.73
Communicable diseases transmissible by intestinal discharges.....	3	.41	2	1.24	5	.56
Communicable diseases transmissible by insects and other arthropods.....	95	12.91	124	76.67	219	24.40
Tuberculosis (all forms).....	16	2.17	5	3.09	21	2.34
Veneral diseases.....	971	131.98	206	127.37	1,177	131.14
Other diseases of infective type.....	179	24.33	57	35.24	236	26.30
Diseases of lymphatic system.....	43	5.84	12	7.42	55	6.13
Diseases of mind.....	23	3.13	5	3.09	28	3.12
Diseases of motor system.....	66	8.97	28	17.31	94	10.47
Diseases of nervous system.....	44	5.98	15	9.27	59	6.57
Diseases of respiratory system.....	990	134.56	206	127.37	1,196	133.26
Diseases of skin, hair, and nails.....	65	8.83	16	9.89	81	9.03
Hernia.....	42	5.71	4	2.47	46	5.13
Miscellaneous diseases and conditions.....	98	13.32	15	9.27	113	12.59
Parasites (fungi and certain animal para- sites).....	134	18.21	22	13.60	156	17.38
Tumors.....	6	.82	2	1.24	8	.89
Injuries.....	427	58.04	77	47.61	504	56.16
Poisons.....	23	3.13	7	4.33	30	3.34
Total.....	4,460	606.20	1,015	627.58	5,475	610.02

TABLE No. 5.—Deaths reported, entire Navy, for the four-week period, December 3 to December 30, 1922, inclusive.

Causes.	Navy (comple- ment), 95,642.	Marine Corps (comple- ment), 21,025.	Total (comple- ment), 116,667.
Meningitis, cerebrospinal.....	1	0	1
Typhoid fever.....	2	0	2
Pneumonia, lobar.....	2	0	2
Tuberculosis, chronic pulmonary.....	4	0	4
Tuberculosis, abdominal.....	1	0	1
Other diseases.....	12	0	12
Malignant growths.....	1	0	1
Accidents and injuries.....	9	0	9
Drowning.....	5	2	7
Poisons.....	3	0	3
Total.....	40	2	42
Annual death rate per 1,000, all causes.....	5.44	1.24	4.68
Annual death rate per 1,000, disease only.....	3.13	0	2.56

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VOL. XVIII

NO. 3

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
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DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

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(MONTHLY)



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1923

NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
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Volume XII, No. 1, January, 1918.
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PREFACE.

The UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, editorial comment on current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,

Surgeon General United States Navy.

▼

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form, such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

U. S. NAVAL MEDICAL BULLETIN

VOL. XVIII.

MARCH, 1923.

No. 3.

SPECIAL ARTICLES.

MOSQUITO CONTROL IN ST. THOMAS.

By E. PETERSON and F. D. WALKER, Lieutenants, Medical Corps, United States Navy.

Like every other tropical country, St. Thomas, Virgin Islands of the United States, has its mosquito problem, the successful solution of which depends upon an ever-present vigilance on the part of the health authorities coupled with a true spirit of cooperation on the part of the householder. Mosquito control in the West Indies is preventive medicine in its most practical application when we take into consideration the many diseases that are transmitted by these insects.

According to Peterson (1) we see that the following mosquitoes are found in St. Thomas: *Aedes aegypti* (Linn), *Culex quinquefasciatus* (Say), *Anopheles (Cyclolepteron) grabhami* (Theob), *Culex (Cacoculex) habilitator* (Dyar and Knab), *Culex inflicus* (Theob), *Aedes portoricensis* (Ludl), *Culex (Transculicia) petersoni* (Dyar n. sp.), *Culex (Melanoconion) atratus* (Theob), *Anopheles albimanus* (Wied), *Uranotaenia socialis* (Theob), *Aedes mediovitata* (Coq). Later *Psorophora (Janthinosoma) coffini* was also found. These mosquitoes were identified by Dr. L. O. Howard and Dr. H. G. Dyar, of the Bureau of Entomology, Washington, D. C.

RURAL PROBLEMS.

The first two species mentioned are the common semidomesticated mosquitoes of tropical regions and are practically the only mosquitoes found to breed in the town of St. Thomas. The others are rural mosquitoes when considered in regard to their breeding habits, although certain species may, at certain times, be found in urban surroundings. Notable amongst these is *Aedes portoricensis* (Ludl), which may occur in large swarms. This mosquito breeds in brackish water and finds ideal conditions for its propagation in the many salt water pools along the shore line that are freshened after heavy rain-

fall. A typical example of their swarming habit is given by Howard, Dyar, and Knab, who state that the mosquito has been found in great numbers in the Caribbean Sea, 40 miles from shore (2).

This insect is not a disease transmitter and hence is of no significance from the standpoint of health. The same holds true of the other rural mosquitoes found in St. Thomas with the exception of *Anopheles albimanus* (Wied), which has the distinction of being the malaria transmitter par excellence in the countries bordering on the Caribbean (2). It was first found in the Virgin Islands in 1919 and breeds in the numerous small pools that are found in the suburbs of the town and in the few small streams that are found in the rural sections. Mosquito control in the country districts is chiefly confined to the eradication of this species.

DESCRIPTION OF THE MALARIA TRANSMITTER.

The anopheles have distinctive larval characteristics that make them easily recognized. The larvæ are surface feeders, and comparatively small in size. They lie flat on the surface of the water in contrast to the culex larvæ and lack the long siphon that is characteristic of the *Culex* and *Aedes*. When the water about the anopheline larvæ is disturbed they do not go to the bottom, but continue to float on top and can be pushed about, as it were, like a bit of dirt. These characteristics are sufficient for the ordinary inspection. Examination with a hand glass will bring out many other features, such as a small, rapidly rotating head, a very short siphon, and a different arrangement of palmate hair tufts. The imago or adult mosquito is readily recognized by the position it takes when resting, projecting the body in a straight line at an angle of about 45° with the resting surface thus resembling a bradawl, in contrast to the humpback position of *Culex* and *Aedes*. The distinctive characteristic of *A. albimanus* that makes it easily recognizable is the number of white rings found on the legs and palpi in contrast to the plain *A. grabhamii*. With these few characteristics in mind, work in eradication can be readily and intelligently carried on.

ERADICATION OF THE MALARIA TRANSMITTER.

In former years malaria of the malignant tertian type was endemic in St. Thomas and at times reached epidemic proportions. Due to the building of a complete system of surface drains with veritable canals to handle the tremendous amount of water draining from the hillsides after a heavy rain, the Danish authorities changed the aspect of the malaria problem from urban to more or less rural. From the reports of the sanitation service during the years 1918–

1920 we find the following figures: In 1918, 13 cases of malaria were contracted in St. Thomas; in 1919, during the first half of the year, 14 cases; during the second half, 1 case; and in 1920, 1 case. Since then no cases have been reported as occurring in the city. Occasionally a case is imported from other islands and is properly taken care of through the quarantine service of the United States Public Health Service.

This happy state of affairs has been brought about chiefly through the activity of the mosquito-destroying fish. The species used here has been determined by the Bureau of Fisheries to be the guppy, *Lebistes reticulatus*. This fish is indigenous to many ponds and streams in some of the West Indian Islands, notably Barbados, which ascribes its freedom from malaria to the presence of the "million fish" as the guppy is commonly called. This fish was introduced into St. Thomas many years ago and was used in a few places in aquaria and lily ponds for ornamental purposes, the male being very beautiful, shining with all the colors of the rainbow. It was not until 1919 when the sanitation service (1) through the courtesy of the Imperial Department of Agriculture, received a shipment of this fish from the botanic garden at St. Kitts, British West Indies, that the fish were first used for the purpose of mosquito eradication. The results obtained are best judged from the figures on malaria morbidity, quoted above. During the last two years no cases of malaria have occurred in St. Thomas.

The problem of mosquito eradication in the rural areas is not an easy one to solve. Permanent pools, well stocked with top minnows, are for all purposes permanently mosquito proof. Sometimes, however, in a protracted dry season many pools are completely dried up. This would seem at first a heavenly blessing, but alas! it does not so turn out. Known pools are easy to find, and when they have some water they always contain plenty of fish and are safe; but when they dry up and the fish as well as the mosquitoes die, then the whole condition is changed. The mosquitoes come back with the first rain, but the fish have to be replanted. Then, too, during torrential tropical rains after a drought, pools have been known to change their location, and new ones spring up for no particular reason; peculiarities of the rock formations probably accounting for their appearance. After rains, oil—crude and kerosene—is used on all temporary pools, and should any of them bid fair to last a month or more, fish are planted. A thin film of kerosene does not interfere with the life of the fish.

A recent extensive survey of the various pools failed to reveal any larvæ from which the malaria transmitter (*A. albimanus*) could be bred.

THE CITY PROBLEM.

The control of mosquitoes in the city of St. Thomas is confined to two species, namely *Aedes calopus* (Meig), now called *Aedes aegypti* (Linn), and *Culex quinquefasciatus* (Say). These two mosquitoes are both disease transmitters and as such are of extreme importance from a sanitary standpoint. *Aedes aegypti*, transmitter of yellow fever and dengue, is the more common. To be sure, yellow fever has ceased to be a factor in St. Thomas's mortality for reasons not related to mosquito eradication but for reasons depending on an entirely different factor, namely the failure of the human host. This feature has been discussed in a previous article (3). The fact remains, however, that the introduction of yellow fever into the present nonimmune population would be a disaster indeed if mosquito control is not carried out intelligently. In a town like St. Thomas, where the householder is absolutely dependent on the storage of rain water for his daily supply of water, the control of mosquitoes is a problem indeed. The water supply must at all times be treated with due respect on account of the ever-present danger of a prolonged drought.

To conduct an antimosquito campaign a certain knowledge of the bionomics of the mosquito is essential.

Aedes aegypti breeds in any artificial container of water, from large cisterns to small tin cans, and is not even adverse to pit privies. In field work it is not practical to identify the eggs of this species as they have no gross characteristic and the larvæ, as seen in a barrel or in a tin, have appearances common to the *Culex*. These come to the surface at an angle and push the siphon, which is easy to recognize, through the surface of the water for air. When these larvæ are at the surface, if the water is disturbed, they go rapidly to the bottom as does the *Culex*. This trait accounts for one requirement of mosquito fighting, i. e., when pouring water from a container, few larvæ of these types are poured out; they go to the bottom. When the container is emptied, very often the larvæ will wash back in the wet film that sticks to the sides of the container, especially if it is an earthenware vessel. Progress from egg to imago in this hot climate averages eight to nine days and in the hottest months seven to eight. The pupæ are not distinctive enough to be an aid to the inspector in determining the species, but may serve to indicate to him how long the container has been a breeding place. The habits of the full-grown *Aedes* are of interest. It stays about man's habitation; it lays eggs in eaves spouts, cisterns, tanks, wells, tin cans, coconut shells, sea shells, and a hundred other miscellaneous containers. The female only is a blood sucker. If a male is found in a house the place of breeding is within 100 yards of the house, more

often 20. The female leaves the house, where it has taken up its abode, only to lay eggs. This mosquito is probably strictly diurnal and bites especially in the early morning and during the afternoon hours. A female in search of its first feed of blood, or when in great need of blood to fertilize its eggs, will attack man almost any time or anywhere and is very persistent.

Culex quinquefasciatus, a transmitter of dengue and filarasis, has the same breeding places as the *Aedes aegypti*. The eggs of the former are very characteristic. They are laid in small rafts shaped much like a boat or perhaps a cucumber seed and float on top of the water. The larvæ hang on the surface at an angle and go to the bottom when disturbed.

This species is nocturnal in its habits and rests during the day on dark walls or objects and in any dark corner of the house. A house may seem free of mosquitoes, but if dark clothing hanging on walls or behind doors is shaken, there will be seen to arise a cloud of these insects that ordinarily rest quietly all day and come out at night to bite the householder and his family.

The flight of the semidomestic *Aedes* and *Culex* mosquitoes is quite limited. This is particularly true of *Aedes aegypti*. It has been said that yellow fever never crosses a street except on two feet. If these mosquitoes are found in a house, the breeding place can nearly always, without exception, be found on the premises.

ERADICATION OF MOSQUITOES IN THE TOWN PROPER.

Before the transfer of the Virgin Islands to the United States no steps had been taken to control mosquito breeding in spite of the many attempts of the local health authorities to bring about the needed changes. But the poor condition of the treasury and the apparent lack of interest on the part of the local lawmaking bodies did not allow any improvements in this regard.

The change in sovereignty carried with it the good will of the people toward the new administration. Needed improvements in sanitation were carried out by property owners in many instances on the bare suggestion of the health authorities and the initial campaign against mosquito breeding was thus started in St. Thomas. Later, August, 1919, the local council (the lawmaking body) passed the following amendment of the sanitary regulations:

"No person shall have, keep, maintain or permit any cistern, tank, well, barrel, or other receptacle of similar character, containing water, in which mosquito larvæ breed, or may breed, unless the same shall constantly be so screened with wire netting of at least 18 wires to the inch each way, or otherwise so covered, as to prevent the ingress or egress of mosquitoes to and from the water therein or thereof.

"No person shall have, keep, maintain, or permit any pond, pool, spring, or other body of water of similar character in which mosquito larvæ breed or may breed, unless the same shall be constantly covered with kerosene or petroleum oil, or other substance, so as effectually to prevent the breeding of mosquito larvæ in the water therein or thereof, or constantly kept free of vegetable growth and other obstructions, and stocked with mosquito-destroying fish, or constantly so screened with wire netting of at least 18 wires to the inch each way, or otherwise so covered, as to prevent the ingress and egress of mosquitoes to and from the water therein or thereof.

"No person shall have, keep, maintain, or permit on any land or premises owned, controlled, or rented by him any can, pitcher, bowl, bottle, tub, bucket, trough, urn, water-closet, water-closet tank, basin, sink, trap, or other receptacle of similar character, containing water in which mosquito larvæ breed, or may breed, unless the same shall be completely emptied and dried, or cleansed daily, or constantly protected as prescribed in last two paragraphs.

"That whenever an extreme case occurs where improvements for the betterment of health conditions are necessary, and the expenses thereof are beyond the ability of the owner or owners of the property, such expenses shall be defrayed in whole or in part by the municipality, which in all cases shall supply mosquito fish free of charge."

Various means can be used in an antimosquito campaign such as screening, oiling, and fish. They all three have their places but it seems that the modern tendency is to use fish to the exclusion of other methods. Mosquito-destroying fish have been used for many years to control mosquito breeding in natural pools, ponds, and sluggish rivers, but their introduction into artificial water containers for the purpose of preventing mosquito breeding is of quite recent origin. H. R. Carter, in a recent article, states as follows (4):

"Hanson has this year greatly developed the use of fish in water containers, depending on it to the exclusion of other methods, and with brilliant success. The same is true, but I do not know if to the same extent, in the work in Mexico and Central America. This method was made known to us in Peru by Connor in the fall of 1920. It would doubtless have been valuable in our work in 1920 had we known of it, but had been less generally applicable in Piura than to the South.

"This method for *Stegomyia* control was first used in Cuba, tentatively, by the sanitary department in 1905 on the suggestion of Major Kean, Medical Corps, United States Army, and on a large scale by McMillan at Camaguey in 1908. Apparently, however, it was not generally known until after its use by Connor in his yellow-fever

campaign in Guayaquil in 1919. It is now in general use and is by far our most satisfactory means of *Stegomyia* control; where applicable, and it usually is, it is our sheet anchor.

"The use of the 'millions' in the water barrels of Barbadoes greatly antedates the above and, as Boyce pointed out, its effect is *Stegomyia* control. Yet it would scarcely be fair to claim priority for this, its purpose being entirely different."

It is of interest to note how Peterson, who was not familiar with the work of Connor in Guayaquil, first introduced the "guppy" into the cisterns of St. Thomas. In February, 1920, he placed a few fish in the two cisterns located on his own premises. He left the cover on one cistern open in order to permit free entry of the mosquitoes. In the course of a week no larvæ had appeared. Mosquito fish were then placed in the cisterns at the municipal hospital and the same results were noted. A general distribution was then started.

To make all containers mosquito proof is a task that calls for perseverance and ingenuity. It would seem at first only a question of carpentry, masonry, and workmanship in general; but with the multitude of containers used in a city that has no water except what is caught from the heavens and that drawn from a small number of brackish wells, it is rendered extremely difficult. In St. Thomas the making of a container mosquito proof is usually combined with the introduction of the top minnows; this combination is the only one that gives absolute results and the two methods will be discussed together. Well water is not much used for drinking and almost all household water supplies are stored in cisterns, tanks, and barrels. All cisterns and tanks have two weak points—the inlet and outlet; some have in addition the opening in the top from which water is drawn by a pail and rope. If the cistern has only the two openings the inlet can be made mosquito proof by concrete work around the pipe and the outlet can be fixed with an 18-mesh wire screen set also in concrete. On first thought this would seem to be all that is necessary. Mosquitoes do breed, however, and escape from such a cistern through the inlet by flying toward the light, or following the air currents in the horizontal or vertical pipe and coming out through the opening where the water from the gutter flows into the pipe. Such a condition was demonstrated by Surg. W. W. King, United States Public Health Service, and described by him in a recent article (5).

The reason for the mosquitoes being in such a cistern, presumably proof against them, is that the adult female, when no better place is available, does lay her eggs in the eave gutters in very shallow collections of water or even on the moist surfaces that remain after a rain. If gutters are not pitched absolutely true to drain dry or if leaves

and dirt accumulate in them such shallow collections of water inevitably remain and after the eggs are deposited and there comes one of the sudden short showers for which these tropical islands are justly famous, these eggs are washed into the cistern and are there hatched out.

The remedy for this would seem to be the screening of the inlet at the level of the eave spout, and this is correct in theory, but in practice it is fraught with perils that a sanitation officer does well to avoid. To make such a screening effective, an 18-mesh wire must be used, and such a wire soon becomes clogged with leaves and dirt. Even if it is perfectly clean and well cared for, it is an unwelcome addition to a rain-catching system for the following reason: The rain usually comes in downpours that tax the capacity of an eave spouting, and where a screen is used the water floods over the spouting and half of it is lost to the householder. When cisterns are low and water is selling by the gallon, this point of screening an eave-spout inlet becomes very important. Sometimes coarse screens have been used at a distance from the finer screen in the hope of keeping the fine screen cleaner, but it has always proved a vain hope. One or two large leaves blown from a near-by tree during the downpour can, when floated against the screen, make a very effective block to keep most of the water from the inlet. The practical manner to prevent mosquito breeding in such a cistern is by planting top minnows in the water, and restocking when necessary until the fish establish themselves. In order that the fish may live and propagate, it is necessary that a certain amount of light be admitted. This can be accomplished by cutting a hole in the cistern cover large enough to admit the light, the size depending on the degree of light available.

The hole can be screened with 18-mesh wire. The usual scheme is to substitute a mosquito-proof screen, fitted to the opening in the cistern, for the cover and leave the cistern open at all times. In case the householder has small children, this screen frame can be made in the shape of a strong parapet which prevents the little ones from falling into the cistern. A certain number of cisterns and tanks are situated under floors and in cellars where there is not sufficient light to support fish. These cisterns in which fish will not thrive have always been the most difficult of our mosquito problems to solve. At the present time, the following device suggested by Dr. V. A. Christensen and perfected by Lieutenant H. H. Montgomery, Medical Corps, United States Navy, for use on the cisterns of the marine barracks, St. Thomas, is being tried with good results. In the downspout on all inlet pipes a trap is made that exactly fits the pipe. This trap is weighted and hung on bearings in such a way that when there is no rain in the spout, it is closed, and the egress or ingress of

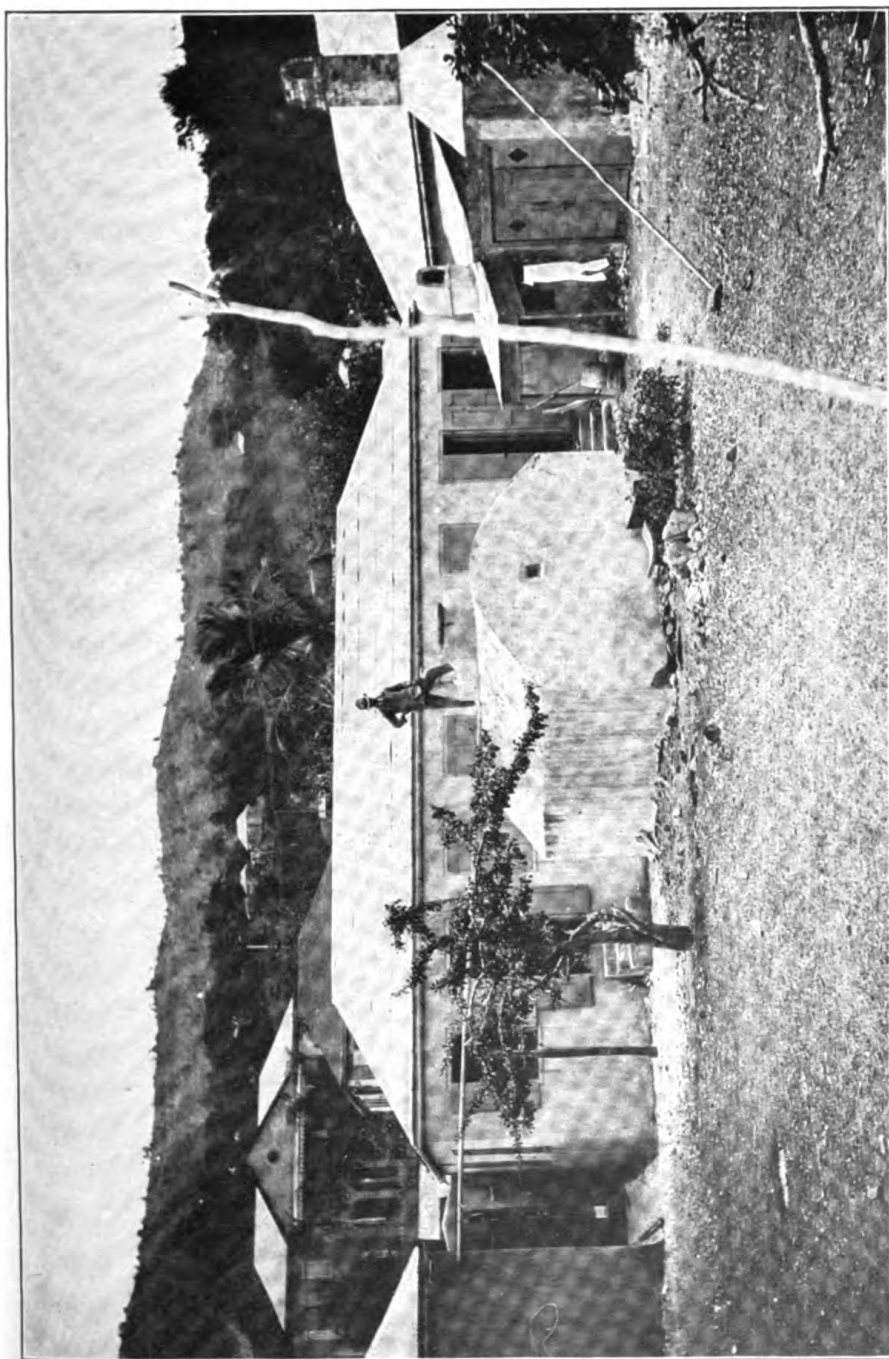
Mosquitoes is prevented. When water pours down the pipe, the trap is forced open and closes again when the water ceases to flow. This device has solved the mosquito-proofing problem in six cisterns hitherto considered impossible to render mosquito proof without great loss of water and it is accepted by us as a proper measure for a householder to use. Such a valve, of course, requires proper adjustment and should be inspected and overhauled every few months. Those in use here have functioned properly for six months without repair. To prove that they actually render the cistern mosquito proof would require an experiment with a mesh wire cage over some inlet connected with the downspout above the valve. Such an experiment has not as yet been tried.

Barrels are used as water containers by small householders, some having as many as 10. The usual scheme for proofing is to have the barrel tightly coopered, cut a small inlet in the head, screen it with 18-mesh wire, and make a hole in the barrel from which to draw water. Some barrels are covered with burlap or fine wire screening held in place by a hoop. These latter are not so permanently mosquito proof. All barrels not proofed by one of these acceptable methods are stocked with fish. During a downpour, when the barrel is filled, the down spout should be removed to keep the fish from being lost in the overflow. It is very hard to persuade the ordinary West Indian to go out in the rain to do this, still, a few more do so from time to time and there is hope for the future. A compromise effected by us answers the purpose quite well. The householder is encouraged to grow a stock of the fish in a jar not under a spout, then after every downpour, should the barrel require fish, he does not need to come to the sanitation office for them, but can plant some of his own. This plan is even more useful when, on the other hand, barrels go dry in protracted droughts and the householder refuses to carry water from the wells to keep the fish alive. We endeavor to get them to remove the fish with something like a small flour sieve, save them in a jar, and restock the barrels when it rains again. All coppers and miscellaneous containers are required to be stocked with fish in the event that they are not successfully screened. Householders come to the sanitation office with a pitcher, a tin can, or some other container and get about 12 fish for each container. Every seven or eight days the sanitary inspector visits each property and he shows on his report if the container still has fish; should it not have any, the householder is given a "fish order" and he is required to take this paper to the office and get more fish. A copy of this fish order is filed in the office as a check on both the inspector and the householder. It is truly remarkable how many of these containers will keep fish in spite of droughts, downpours, and human frailty. The people do not always come

after the fish when given an order, nor can they be forced to, because the law only requires that they do not breed mosquitoes, and they always have the option of oiling the water, straining it, or even throwing it away. A great many people, in spite of the good example of neighbors, will not have fish in their water barrels. Their attitude seems to be reactionary to what they consider meddling and useless measures. About 80 fish orders are given out every week for the whole town, and our records show that from 50 to 75 per cent are filled. Some people take the other side and cultivate the fish with care; they heed our advice and have no difficulty in keeping their places mosquito proof. It would be difficult to say how many of these containers are in use; they fluctuate with the rainfall, but there is probably nearly a thousand.

It is difficult to persuade some people that such small things as tomato cans used as flowerpots, conch shells, and flowerpots with saucers are a prolific source of mosquito breeding. These things used to be the rule in St. Thomas, but now happily they are the exception. Those who build flower beds surrounded by shells are required to bore the shells or place them in such a way that they can not hold water. There is also a great temptation to put saucers under flowerpots to catch the excess water after the morning watering, and these, tucked away on shelves and under windows, are often a source of annoyance. Quite often the matter has to be thoroughly threshed out with the householder because an otherwise mosquito-proof house may be infested in this way. The small "water monkey," a porous earthenware jar, used to cool water, is too often a breeding place for mosquitoes. Nothing but eternal vigilance in inspection will combat these small containers; they can never be wholly abolished in this land of rain water and high-priced ice.

The use of oil on water containers is a first and last resort. When larvæ are discovered in any body of water, if the water is to be used for drinking or cooking, there is considerable objection to the use of oil. If the container is a barrel and the water is drawn from a hole low down, there is no mixture of oil and water. If it is a cistern or tank with a faucet or pump the same thing holds true, but in any container from which the water is dipped the oil film is objectionable, and is not put on except where there happens to be a great many larvæ. A few fish are planted if the light that has entry into the cistern or tank is sufficient to sustain the life of the fish; if not, the owner has the alternative of using the oil every week or installing a pump in a mosquito-proof manner, and sealing up the container. A thin film of oil does no harm to the fish so far as we have been able to determine. Water caught in tubs and casks for washing purposes, which the owner promises faithfully to use within two days, is always oiled, because, invariably if the place is visited



TYPE OF CISTERN PERMANENTLY STOCKED WITH FISH.
Note long spout behind calabash tree.

300—1



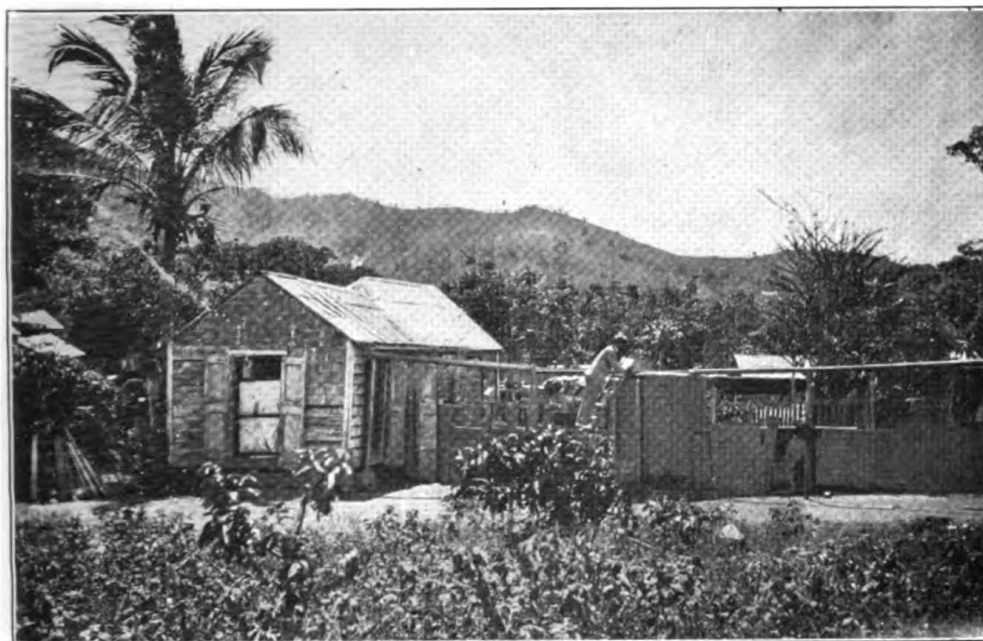
INSPECTING CISTERN WHICH FORMS PART OF THE FOUNDATION OF A HOUSE.

Note the numerous possibilities for the breeding of mosquitoes in the yard.



TYPICAL NATIVE YARD, SHOWING OPEN BOXES CONTAINING WATER FOR CHICKENS.

300—2



LONG PIPES LEADING TO THE TANK FAVOR MOSQUITO BREEDING.



WATER BARRELS PROPERLY SCREENED CATCH THE FAMILY'S WATER SUPPLY FROM THE IRON ROOF. THE INSPECTOR FINDS MOSQUITO LARVÆ IN THE FOWLS' WATER DISH.

300—3



TYPICAL NATIVE YARD IN ST. THOMAS SHOWING VARIOUS RECEPTACLES FOR
STORING WATER.



TYPES OF WATER CONTAINERS WHICH READILY FAVOR THE GROWTH OF
MOSQUITO LARVÆ.

300—4

one week later, these containers will be found swarming with larvæ and the householder's apologies will be almost as plentiful as the larvæ. Many are the excuses given: There was no oil, the man of the house would not give any money, the children poured off the oil, the wind blew it off, and so on, with childlike simplicity. Every efficient inspector stays with the case until the oil is spread, even if he has to do the job himself. As these containers are used to wash clothes, no fish can be used in them and oil is the only remedy.

After cisterns, tanks, barrels, etc., have been rendered thoroughly mosquito proof, eave spouts cleaned, and all extraneous containers stocked with fish or disposed of, if the householder still has mosquitoes in the dark corners of the rooms, then the inspector sometimes finds that the pit privy on the premises or one near by is the breeding place. During rainy weather a good many pits contain water at all times. A pint of oil in a large pit will do away with this breeding place, and if repeated at such intervals as the circumstances demand, will insure against further trouble.

No great difficulty is encountered in keeping wells free from larvæ. There are 220 wells in the municipality of St. Thomas exclusive of those on country estates. These wells are on the average about 18 feet deep, and contain during an ordinary season about 5 feet of water. Mosquitoes do not frequent them unless water is unusually scarce, and then the level of water is so very low that it doesn't offer a very good breeding place. Top minnows will grow in almost every well, even close to the sea where the water is very salt; sometimes they have to be planted over and over again, but few wells absolutely fail to grow fish.

In spite of the fact that a cistern or tank is considered mosquito proof when the inlets and outlets are properly screened and the down spout is well trapped, the fact remains that all such screening and trapping is subject to deterioration, and is not permanent. An extensive inspection service by well-trained, conscientious, and honest inspectors is absolutely necessary to check the upkeep; and householders are put to considerable expense in this tropical country, where all forms of wood rot in record time and iron rusts through very quickly. The only permanent means of mosquito eradication is the stocking of water with mosquito-destroying fish—top minnows. When a container becomes a breeder of fish it ceases to be a breeder of mosquitoes. Screens may break through, wood may rot, and iron rust, but the fish keep on working and no expense is involved after the initial outlay.

The guppy is a cannibalistic animal when hungry. This cannibalism is one of the saving graces of the fish when they are used in cisterns and tanks. If a water container is thoroughly clean and

free from vegetable matter, it will support only a very few fish. When they become numerous and food is scarce, the bigger ones eat the little ones and the cistern maintains the right quantity; otherwise they might become so plentiful that they would pollute the water. A water container that swarms with fish is dirty and needs cleaning. If a householder complains that the water swarms with fish and smells fishy, we can readily show him that the cistern needs cleaning. No effort has ever been made to feed these fish, principally because there has been no need for it. A quantity for distribution has always been easily made by stocking pools and public fountains.

As in every branch of public sanitation educational propaganda is of extreme importance. The natives of the Virgin Islands have, ever since the transfer to the United States, been subjected to an intensive course in public as well as personal hygiene. Talks and demonstrations have been given to school-teachers and their pupils regarding mosquitoes and their control; neighborhoods have been canvassed continuously until there has been developed many fish-stocked water containers. In a number of instances where country homes of the better sort have been mosquito infested, they were entirely freed of these pests and kept so at no expense to the owner, simply by planting a few fish in the various water containers.

The best and most successful argument in favor of installing the fish is the financial argument. The making of a cistern absolutely mosquito proof and the installing of a pump might cost in some instances 20 or more dollars; the planting of a few fish costs nothing, and very often where a householder has refused to have fish when first asked, if he is faced with the alternative of spending some money for wire screening and a pump, he invariably takes the fish. Once a cistern is stocked with fish the owner's troubles are over and so also are the troubles of the sanitation officer. Educational talks help a lot, demonstrations are excellent, but after all, the money argument is the best, and the breeding of fish is bound to save the inhabitants of St. Thomas a lot of money that would otherwise have to be spent for repairs to mosquito proofing.

In a summary of the objects to be striven for during a mosquito eradication campaign Sir Ronald Ross makes some statements that apply so well to St. Thomas that they have served us as guides. He says:

"We do not propose to exterminate mosquitoes in any entire continent. We propose only to deal with them in the town in which we live and in its suburbs.

"We do not propose to get rid of every mosquito even in this town. We aim only at reducing the number of these insects as much as possible.

"We do not think it possible to drain or treat every breeding place in town. We aim at dealing with as many as possible.

"We can not exclude mosquitoes which may just possibly be blown into the town from miles away. We content ourselves with preventing the insects breeding in the town itself."

Sir Ronald Ross gives the following summary of methods:

"We start work at once with whatever means we can scrape together.

"We operate from a center outward.

"We clear houses, back yards and gardens of all rubbish, empty tubs, and cisterns containing larvæ.

"We show people how to do these things for themselves and how to protect tubs and cisterns by means of wire gauze.

"When we have cleared as many houses as we determine to deal with we clear them over again and again.

"We fill up or drain away all the pools, ditches, old wells, and puddles we can, especially those that contain most larvæ.

"Where we can do nothing else we kill larvæ with oil periodically, or by brushing them out with brooms or by other means.

"Our motto should be one which I think will shortly become the first law of tropical sanitation, namely, 'No stagnant water.'"

As St. Thomas is forced to maintain about its homes as many as a thousand containers of stagnant water, our motto should be: *No stagnant water without mosquito-destroying fish.*

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THE DIAGNOSIS AND TREATMENT OF GASTRIC SYPHILIS.¹

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Nowhere, perhaps, is it more true that the correct diagnosis is the most important element in successful treatment than in syphilitic disease of the stomach. This is well demonstrated by the resistance

¹ This article is the result of observations made in the service of Dr. R. Bensaude at the Hôpital Ste. Antoine in Paris.

of gastric syphilis to ordinary dietetic and medicinal treatment while the results with specific therapy are often very striking.

The cure with specific treatment is more than symptomatic; there are records of anacid gastric juice returning to nearly normal acidity and one of our own cases showed a return to normal of the motor activity as well as of the configuration of the stomach as seen on X-ray examination.

The diagnosis of this condition is difficult because of the diverse clinical forms which this disease may assume. Gastric syphilis may simulate almost any disease of the stomach, from chronic gastritis (1) to chronic ulcer or carcinoma, and even a carcinoma coexisting with a gumma of the stomach has been found (2).

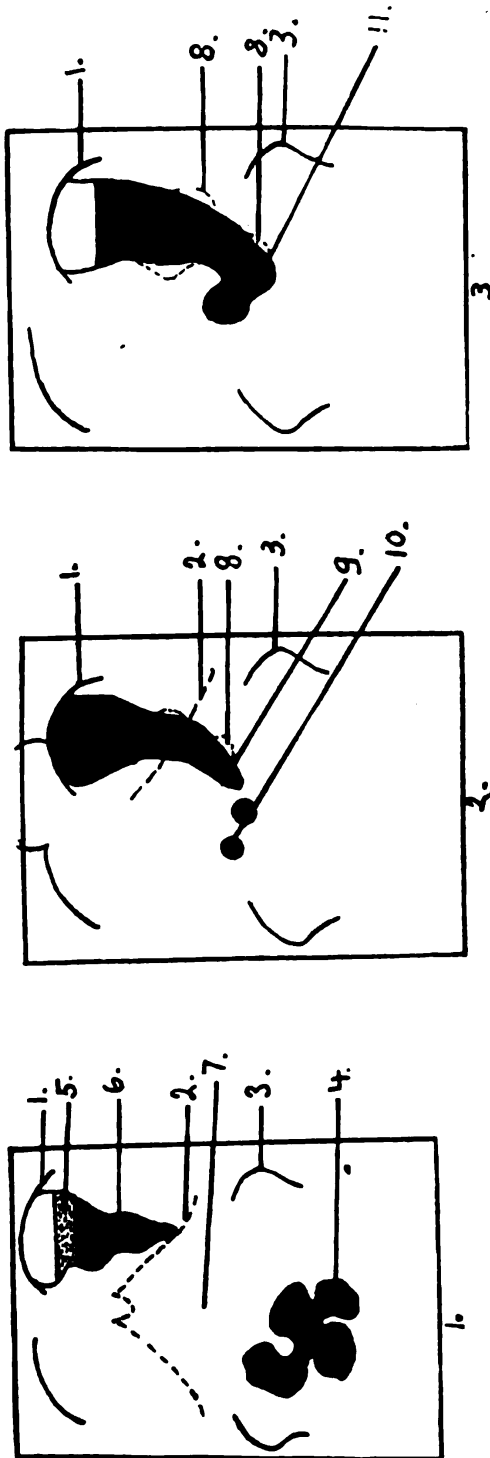
Bensaude and Rivet (3), Savignac (4), and many others attach great importance to a history of syphilis, either hereditary or acquired, clinical or serological evidence of this distress, and the result of specific treatment. The first-mentioned authors also point to the variability of the symptoms and to the unusual combinations of clinical manifestations as features of gastric syphilis.

The onset of the disease may be sudden or gradual. A sudden onset with profuse hematemesis is not uncommon. One of our cases began in such a manner and the case is of further interest because of the complete cure from a clinical and Roentgenological point of view.

CASE 1.—The patient was a male, aged 55. He had had sudden, profuse hematemesis of dark blood, followed by dark stools on October, 1915. He suffered from dyspepsia for two and a half years previous to this hemorrhage, and was annoyed by a pulling pain in the epigastrium about three hours after meals with no radiation but with relief after food. He was forced to remain on his back when he had these pains. He had lost about 25 pounds in the last two years but gained about 5 pounds in the last month. He had frequent headache, was easily fatigued, and there was a tendency to constipation. Nausea, vomiting, and regurgitation were not present. Venereal infection was denied.

He had another sudden attack of profuse hematemesis of dark blood on April 7, 1920, about 20 days before admission to the hospital. This hematemesis occurred about three hours after his noon meal and he vomited about a liter of blood. There was slight icterus after this hematemesis and the epigastric pain became worse after the act.

Examination showed an emaciated, pale, and cachetic patient with an abdomen that was rigid but not tender. The rigidity of the abdomen prevented a thorough palpation of this region. There was



REDUCED REPRODUCTIONS FROM X-RAY PLATES TAKEN OF A CASE OF GASTRIC SYPHILIS BEFORE AND AFTER SPECIFIC TREATMENT (CASE 1).

FIG. 1.—Gastric syphilis, showing amputation of the pyloric region. The stomach is pear-shaped and contains a large quantity of liquid, although the patient was examined with a fasting stomach. There are no peristaltic contractions and no bismuth passes the pyloric region. The plate was taken at the time of admission to the hospital, and was corroborated by fluoroscopic examination, as were the others.

FIG. 2.—The same stomach after specific treatment for two months. The stomach appears below the left costal arch. Some contractions are seen along the greater curvature and the pyloric region shows signs of filling and passage of bismuth.

FIG. 3.—Examination after three months of specific treatment with an organic arsenic preparation. The stomach is normal in contour, emptying time, and there is no retention.

Landmarks and changes shown in illustrations: 1=diaphragm, 2=costal arch, 3=ilac crests, 4=small intestine, 5=liquid in fasting stomach, 6=pear-shaped stomach under ribs, 7=absence of pyloric region and large part of pars media, 8=contractions on greater curvature, 9=descent of shadow and appearance of pars media, 10=patches showing irregular transit of bismuth through the pyloric region, 11=return of pyloric region and pars media to normal.

so much stasis of the gastric contents that the organ could not be satisfactorily emptied in order to make a reliable examination of the stomach contents. The Wassermann test was repeatedly negative.

The X-ray examination showed a small, pear-shaped stomach with the large end above. There was marked retention in the stomach, the pylorus appeared amputated and the filling of the duodenum was slight and retarded. There were no tender points. The visible part of the stomach did not reach below the left costal arch and this may account for the absence of tenderness.

A diagnosis of extensive carcinoma of the pylorus was made, but it was decided to try antisyphilitic treatment as a last resort. An organic arsenic preparation was employed and the result was prompt and striking. The patient gained in weight after the first injection and all symptoms disappeared in a few days. The accompanying illustrations are copies of the X-ray plates taken before and after antisyphilitic treatment. The first shows the condition of the stomach before treatment. The second was taken two months after treatment was begun and shows that the middle and a part of the inferior portions of the stomach are below the costal arch, the bismuth begins to pass through the pylorus, and some peristaltic contractions may be seen along the greater curvature. The third illustration shows the condition of the stomach three months after the treatment was begun. The contour is normal, peristalsis is present and there are no signs of stasis.

In a letter written by the patient two months after his discharge from the hospital, he stated that he continued to gain in weight and that he was free from all symptoms.

This case is of interest because it shows the results of specific treatment. It also shows that the absence of a positive Wassermann is no positive indication that syphilis is not present. The therapeutic result in this case, in spite of the diagnosis of carcinoma and of the negative history and negative serological tests, leads us to say that every case of suspected carcinoma of the stomach should be given the benefit of a short but intensive antisyphilitic treatment no matter how hopeless the outlook.

The second case is of interest because it shows the futility of operative treatment if unsupported by specific therapy. This case closely resembled the ordinary chronic gastric ulcer which has undergone carcinomatous degeneration. A more detailed report of the pathological, clinical, serological, and X-ray findings may be found elsewhere.²

CASE 2.—The patient was a male, 51 years old, with a previous history that was negative except for a chancre at the age of 25. The

² *Brams-Archiv. f. Verdauungskr.* Bd. 27, Sept. 6, 1921.

present complaint began gradually about three years after his chancre, recurring chiefly in the spring and lasting until fall.

He complained of epigastric pains about two and a half hours after meals. The pains were much relieved by vomiting and soda produced relief only during the first stages of the disease.

There was only occasional vomiting at first, but it later occurred daily. The vomitus amounted to about half a liter and contained food particles but no blood. Retention vomiting occurred later in the disease.

The vomiting and pains soon increased and occurred without relation to meals. The epigastrium became very tender and the slightest movement caused intense pain. The anorexia, nausea, and constipation became worse, and there was a striking loss in weight and strength.

Examination showed a very emaciated patient. There was indistinct tenderness of the abdomen. The liver was palpable about one finger below the right costal arch, but the spleen could not be felt.

The gastric contents showed about 150 cubic centimeters of turbid fluid, with food particles and some mucus. The total acidity was 2 and the free hydrochloric acid was 0. Blood, lactic acid, sarcinæ, and large bacteria were absent.

The X-ray examination showed retention of about half of the bismuth meal six hours after ingestion. The stomach was high, longitudinal, and not dilated. The lower part reached to the navel. There was pyloric insufficiency with the pyloric portion appearing like a narrow canal, about 2 centimeters long, with serrated walls and a lumen about as thick as a lead pencil. The duodenum was normal and there were no tender points.

The Wassermann, taken after operation, was + + +.

The diagnosis was carcinomatous degeneration of a peptic ulcer, and resection was performed. This diagnosis was based on the clinical history, which resembled that of chronic peptic ulcer, the anacidity, and the X-ray findings.

The macroscopic examination of the portion removed at operation showed that there was a syphilitic process in the region of the pylorus. It was decided to wait until the patient had recovered from the operation before specific treatment should be started, but the patient developed postoperative pneumonia and lung abscess and died three weeks after operation. The autopsy showed typical syphilitic scars of the left lobe of the liver, and the rest of the gastrointestinal tract showed no syphilitic changes.

Examination of the part of the stomach resected at operation showed the following characteristics:

Macroscopically.—The changes were almost solely confined to the submucosa. The ulcer was large and shallow, not extending

below the muscularis mucosa, and was irregular in outline. There were two more such ulcers, but they were much smaller. There was a plaquelike thickening and rubbery consistency of the submucosa of the pyloric region. Closer examination showed many small, white, miliary gummata in the submucosa which were about the size of a pin point. The muscular layer was practically intact.

Microscopically.—The changes were also practically limited to the submucosa and consisted of the following:

Edema of the submucosa.—This was very marked and was the chief factor in the thickening of this layer to four to five times its normal thickness. The edema was caused by the obstruction to the venous return of blood due to the changes in the veins about to be described.

Endophlebitis and periphlebitis.—These characteristic vascular changes were in the veins. The earliest form was inflammation of the adventitia, with subsequent lymphocytic infiltration. The outer layers then became involved until the lumen was completely obliterated. Healing occurred by fibrous tissue formation. The obliteration of the lumen persisted. The involvement in all stages was in patches and not around the entire circumference of the vessel. The arteries showed moderate changes which could not be considered specific.

Miliary gummata.—These were very numerous and were located in the submucosa just below the muscularis mucosa. They were chiefly of lymphocytes, but there were some of plasma cells. There was no necrosis or caseation.

Perivascular infiltration.—These were chiefly around the veins and consisted either of lymphocytes or plasma cells.

Diffuse round cell infiltration.—This was especially marked at the base and sides of the ulcer. An occasional giant cell was found in this infiltration.

Superficial ulceration.—The ulcers were limited to the mucosa. The base and sides were of granulation tissue with lymphocytic infiltration. The gummatus involvement of the submucosa extended for some distance beyond the ulcerations.

A careful review of the literature was made, and 46 cases were selected. The two cases just described are added, making a total of 48, of which 8 were proved anatomically.

Consideration of these cases shows that a diagnosis of gastric syphilis can not be made on any one finding but must be made on a complex of symptoms and signs. There are some characteristics which are common to almost any form of syphilis of the stomach but the underlying pathology will modify and augment the individual picture according to whether the syphilitic lesion is ulcerative, tumefactive, catarrhal or stenotic in nature.

The following are the most common features to any form of the disease:

1. A history or evidence of syphilis elsewhere in the body and positive serological tests is strong presumptive evidence.

2. A chronic course which is capricious and rebellious to ordinary dietetic and medicinal treatment should lead one to think of gastric syphilis. The variability of the course and an unusual combination of symptoms have already been mentioned. But not all cases of gastric syphilis are chronic in course, as one of our cases began with a sudden and profuse hemorrhage.

3. The therapeutic test is immediate and striking. It should be short and intense and the improvement must be distinct. The delay in cases in which carcinoma is suspected must not be too long if the patient is to be given the best surgical chances.

4. Pain was the most common symptom, and it was present in all but one of the 48 cases. It was variable in character but usually came on after meals, was located in the epigastrium and showed but little tendency to radiation. Vomiting usually relieved the pain.

5. Anacidity and subacidity were frequent. Anacidity was found in 33 per cent of the cases and subacidity in 12 per cent. These figures are probably much too low, as the gastric juice had not been examined in more than half of the cases and the percentages are figured for all of the 48 cases. These findings are of great importance in the differentiation from ordinary peptic ulcer.

6. Emaciation was frequent and usually very marked. The luetic cachexia may lead to confusion with that of a chronic ulcer which has undergone carcinomatous degeneration; but the yellowish tinge of the skin, so often seen in the cachexia of malignancy, was absent.

7. Hematemesis occurred in about 40 per cent of the cases and was often profuse. It may be the initial symptom as occurred in our case.

Vomiting occurred in 75 per cent of the cases, and the stomach was often intolerant to milk and liquids as well as to solids. There was no characteristic X-ray picture, as the findings depended on the underlying pathology and resembled that of carcinoma of the pylorus, peptic ulcer, pyloric stenosis, hour-glass stomach, stenosis at the cardia, and a combination of stenosis at the cardia and pars media. Epigastric tenderness does not seem well defined or sharply circumscribed in the majority of the cases—a finding which may be of differential value from peptic ulcer. The long course and the absence of continuous melena in the stools may differentiate gastric syphilis from carcinoma. The Wassermann was positive in all but one case in which the test was made. The latter case was observed by us, but the results of specific treatment left no doubt as to the nature of the case. Specific treatment should be tried in selected

cases, even if the Wassermann is repeatedly negative as was the case in our first observation.

TREATMENT.

The treatment falls into three subdivisions.

1. Diet and local treatment of the stomach.
2. Specific treatment.
3. Surgical treatment.

The ordinary measures employed in gastric ulcer should be used in gastric syphilis. This includes diet, bismuth, and general symptomatic treatment. Alkalies may be unnecessary in view of the frequent subacidity or anacidity, but large doses of bismuth should be used, as much as 20 grams a day, in view of the recent success obtained with the treatment of syphilis in other parts of the body by employing bismuth.

The specific treatment consists of salvarsan or other preparations of arsenic together with parenteral use of mercury. The dose and method of employment is not different from that used in general.

The use of injections of bismuth in the treatment of syphilis was recently described by the Pasteur Institute of Paris. The method consists of injections of sodium and potassium tartro-bismuthate in oily suspension intramuscularly. The injections are made twice a week, and the course of treatment is much like that with mercury.

Surgery is indicated in perforation and in mechanical deformities or stenosis by scars. The connective tissue scars are but little affected by specific treatment, and it may be necessary to perform gastroenterostomy, resection or anastomosis of the two pouches of the hour-glass stomach. Surgery is also indicated if carcinoma is suspected and if there is no improvement with specific treatment. Antisyphilitic treatment should follow operation in all cases in which syphilis is suspected.

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THE SCOPE OF X-RAY THERAPY IN NAVAL PRACTICE.

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That the modern Roentgen-ray equipment found in practically all naval hospitals is a powerful therapeutic agent, of great benefit in a wide range of pathological conditions, is a fact not appreciated nor applied to its fullest extent by the majority of naval practitioners.

Several factors contribute to this lack of appreciation, namely, the comparatively few medical officers with the training necessary for the application of this method of treatment; the novelty of the X ray and its recently discovered value in the control of many diseases; the constant, almost daily, changes in apparatus, technique, and range of clinical application; and, to a large degree, the skepticism among internists and surgeons, caused probably by an unfortunate period in the development of this field when unscientific optimism, amounting almost at times to charlatanism, on the part of some of its advocates, cast the entire subject of X-ray therapy into temporary disrepute.

The development of the modern X-ray apparatus starts from Abbe Nollet, who in the eighteenth century first passed a current of high potential through a tube of lowered atmospheric pressure. Geissler, in 1859, and Crookes, about 1890, constructed similar but improved tubes in which physical phenomena strange to that day were observed; and the final discovery of actual X rays and their power to penetrate opaque substances was announced by Roentgen in 1895. Within a month or so after this announcement, investigators discovered that the new rays produced pronounced biological changes in the skin after prolonged exposure, and Schiff and Freund suggested their use in the treatment of disease, thus marking the birth of X-ray therapy. Within a few months the medical press was filled with reports of marvelous results following the empirical application of the rays in almost every field of medicine. The fact that they seemed to exert a beneficial effect on malignancy and tuberculosis led to the belief that a specific had at last been found for these terrible diseases.

As aptly stated by MacKee in his recent valuable work on X rays and radium in the treatment of skin diseases, the history of roentgenotherapy, especially in this country, may be divided roughly into three periods: Optimistic, pessimistic, and realistic. During the first years of its use, radiation was tried in nearly every chronic disease. The literature was full of case reports of wonderful cures. Many physicians installed apparatus and attempted to use it for therapeutic purposes without preliminary study of the subject. Naturally, many patients received serious injuries and only a few received actual benefit. The operators themselves, not realizing the dangers of their powerful tools, burned themselves rather generally. However, the uncertain rays of those days enjoyed a wide vogue with the more radical type of practitioner until 1906 when the limitations of radiation began to be recognized. It was found that X rays were capable of producing a cure in only a certain percentage of the superficial epitheliomata; that they were exceedingly unreliable in deeper malignancy, and in any event did not replace sur-

gery; and that they were practically useless in pulmonary tuberculosis. These failures to fulfill original expectations proved a keen disappointment to the entire scientific world. Finally the lay public, and even the greater part of the medical profession, not only lost faith in their therapeutic value but considered them an exceedingly dangerous and almost useless remedial agent. The unverified accounts of marvelous results, the unsubstantiated early claims, together with the injurious effects received by patient and operator, due in a majority of cases to lack of training, finally resulted in the period of depression or pessimism which lasted from 1906 to 1912. During that period, however, knowledge was added bit by bit to that already in hand through the combined researches of the pure scientists and the clinical observations of the applied therapists. Great improvements in apparatus by the physicist, as well as theories and explanations of the electrical and biological principles involved, placed roentgenotherapy upon a more stable scientific basis; while from the many reputable roentgenologists a mass of clinical data was gradually collected, resulting in standardized technique, minimized danger to patient and operator, and partial realization of the limitations and possibilities of the new therapeutic agent.

The modern era of scientific therapy practically dates from the introduction of the hot cathode tube by Coolidge in 1914. Prior to this time the dosage of X rays was exceedingly difficult to estimate, due to the inconstancy of output of the gas tubes and the impossibility of knowing just how much radiation was being produced even with the same machine, tube, and setting. The direct radiometers of Sabouraud, Holznecht, and Kienbock were used but they were unreliable, open to personal error, and were difficult to use without long experience. The Coolidge tube, giving definite output of rays corresponding to a definite input of electrical energy, regardless of tube, machine, or operator, permitted exact duplication of results, and made the figuring of dosage a simple question of mathematics, thus revolutionizing the field of roentgenotherapy. Other developments which have changed the application of the X ray from a rule of thumb method to its present more exact and scientific basis, and permitted the elaboration of the new and powerful "deep therapy" technique, are the replacement of the old style static machine and induction coil by the interrupterless transformer, the filtration and cross-firing technique, the 200 kilovolt apparatus, and the as yet unperfected iontoquantimeter.

"At last the value and limitations of the X rays in the treatment of disease have been fairly well established; especially is this so of cutaneous affections." MacKee summarizes the present status of this field as follows: "The improvement in technique, increased knowledge regarding possibilities and limitations, the recognition that

roentgenology is a specialized subject, and especially the fact that radiodermatitis can be avoided with a reasonable degree of certainty, have caused a gradual restoration of confidence, and this confidence will be permanent if the work can be kept out of the hands of unscrupulous, overenthusiastic, and careless individuals."

A brief review of some of the physical characteristics of X rays will serve to illustrate some of the problems that must be met to obtain radiation sufficiently reliable for accurate and heavy work. The rays emitted from a Coolidge tube are electromagnetic waves of very short length, produced by the impact on the anode of a current of electrons projected from the heated cathode by an electrical current of high potential. Among the effects produced on material objects are changes in photographic emulsion, fluorescence of certain crystals, ionization of susceptible substances, and pronounced action on the growth and reproduction of living cellular tissue. While partaking to a great measure of the nature of light, the extremely short wave length of these rays causes them to differ from it in many ways; they do not excite vision on the retina, can not be refracted or reflected by the agencies which thus affect light waves, and they can pass through matter which is impervious to light. Like light rays, which may be separated into their component colors, each of different wave lengths, the X rays are not homogeneous but may also be separated into many different wave lengths and a typical spectrum may be obtained by the use of crystals. In radiotherapy the word "ray" is used to denote two dissimilar physical phenomena, thus producing some confusion. As Shearer says, "We use the term 'ray' to define the path along which some wavelike disturbance travels, as in the case of light rays, heat rays, Roentgen rays, and gamma rays, where no transfer of matter is involved." Again, some substances under certain conditions emit small particles of definite size and properties which are concrete entities and may be studied as individuals. Of such character are the alpha and beta rays of radium and the cathode rays of the X-ray tube.

When X rays of high penetration strike a substance, such as a block of paraffin or the human body, the result is dependent upon the heterogeneous character of these waves. The softest rays, those of longest wave length, will be stopped on first meeting the substance and will have an effect only on the surface. The hardest rays, those of shortest wave length, will pass entirely through the substance and may be recorded by photographic emulsion or fluorescent screen on the other side. The waves between these two extremes will penetrate into the body a certain distance and there will be absorbed at different depths according to their individual wave lengths. During the passage and absorption of these different rays, phenomena occur

which are thought to be the basis of their biologic and therapeutic effect. "Scattering" occurs, causing the definite cone of rays to spread out in other directions much as light is scattered in a fog. At the contact of the rays with the atoms of the substance, ionization occurs with emission of electrons or "corpuscular" rays by the atoms thus acted upon. These secondary rays, like the beta rays of radium, are actual particles, and it is considered their therapeutic effects are caused by their action on the surrounding tissue. Thus it is seen that the biologic action is entirely due to that portion of the radiation that has been actually absorbed. The question of secondary, characteristic, and corpuscular rays, of which many varieties have been found, has still to be completely investigated, and in this field the answer to many of the biochemical problems of X-ray behavior will probably be found.

Filtration is the process of stopping the softer rays which affect the skin but do not penetrate enough to give results in the deeper tissues. By permitting only hard rays to pass, more of the radiation will be absorbed by the underlying structures, and the higher the tube voltage the more penetrating rays will be formed. Filtration does not make hard rays, but increases their percentage by cutting out the softer ones, thus decreasing the total radiation and necessitating longer exposure. Two other factors influence greatly the production of rays which will take effect in deep structures. The distance of the tube from the skin, and the size of the area exposed, both determine the effective depth of the dose. However, it must be realized that the skin always receives a larger dose of ray than any deeper tissue, thus limiting any one dose to underlying structures to less than the toleration dose of the skin. All that can be done by filtration, increasing voltage, distance, and area exposed acts only to lessen the disparity between skin dose and tissue dose, but can not overcome or reverse it.

No discussion of radiotherapy can be complete without mention of radium and its emanations. The alpha and beta rays of radium have a pronounced but quite superficial biologic effect. The gamma rays are true wavelike rays, almost identical with X rays, but of shorter wave length and greater penetration. The advantages of radium are mainly due to its mode of application; it is particularly fitted for use in body cavities and in the form of emanation may be embedded directly in the pathological tissue. Thus radiation may be administered from without by X ray and from within by radium, greatly increasing the therapeutic effect. The total quantity from a practical dose of radium is far less than that from an X-ray dose; it acts more unequally and over a much smaller field; the expense and trouble of preparation and handling are enormous. There is no

question as to which is superior in composing X rays and radium; they are both different modes of applying the same agent, radiation; each is most suited to its particular indications, and often is most valuable only when used in conjunction with the other. While at present it would hardly be considered practicable to introduce the use of radium into naval practice, the future will see possibly one hospital on each coast equipped with a complete radium emanation plant, when its uses have been more fully developed and its preparation and care made less expensive and exacting. Judging from its present status, later developments may make the use of radium a routine procedure in the treatment of all malignancy.

The apparatus needed for X-ray therapy depends on the type of work to be performed. For superficial or cutaneous therapy an X-ray plant capable of general diagnostic radiography, with a standard Coolidge tube, is sufficient. For deep therapy, the full-size transformer, corresponding to the Wappler-Bellevue type, found in many naval hospitals, with a 12-inch spark capacity, is needed. Accurate meters of the usual types are a necessity, for modern dosage depends almost wholly upon current and voltage measurement. Well-seasoned, broad-focus, universal Coolidge tubes are needed to carry the heavy current required. Filters of aluminum, carefully tested for flaws and inaccuracy, must be procured. Protection of the patient from electric shock and the operator from scattered and secondary rays from both the tube and the room must both be given careful attention. The treatments should be given on a nonmetallic, nongrounded table. The operator should be shielded in a lead lined cubicle almost surrounding himself and the controls. The single lead screen in use in ordinary radiographic rooms is insufficient protection against the continued use of strong therapeutic rays.

During the past five years a new type of apparatus and technique has been developed in Germany for deep therapy, particularly for use in malignancy. In the past year it has been rather widely adopted by the specialists in this country, where several score of the new-style machines are in operation. These give a maximum potential of 280 kilovolts as against the 120 of the old transformers, and use a 20-inch spark gap and a specially designed Coolidge tube. The transformer for producing this voltage, as usually built in this country, is based on the principle of simply connecting two ordinary 10-inch transformers in series, but as insulation troubles are said to increase in proportion to the cube of the rise in potential, most of these plants are the source of constant burnouts or breakdowns. A new principle has been developed by Rieber, and several machines designed by him have been working steadily on the west coast with far less trouble than the other types based on the older devices. He uses but one 12-inch transformer, and by the use of several small

"booster" transformers raises the potential to the desired limit with only a few feet of the line carrying the highest voltage. High filtration, using copper as a medium, long tube-skin distance, and accurate measurement of energy by sphere-gap voltmeter and double milliammeters, are essential factors in this new technique. Its result is to increase the number of hard rays absorbed by the underlying pathological tissue without increasing the dose to be borne by the skin.

Continued radiation has a profound effect on all living tissue, both normal and pathological. However, some types of cells are far more resistant to this destructive action than others and will stand a dose without apparent injury that will kill more sensitive cells. Thus the object of X-ray therapy is to administer a dose that will favorably affect the cells involved in the pathological process without injuring the normal tissues about them. The selective action of the rays is expressed in the law of Bergonié and Tribondeau, that immature cells and cells in active state of division are more sensitive to X-rays than are cells which have already acquired their fixed adult morphological or physiological characteristics. Apparently the effect of moderately strong radiation is not to destroy the cell itself but its ability to reproduce itself, thus resulting in its natural death at a later period. The most sensitive structures of the human body appear to be first, the mucosa of the mouth, small intestine, rectum, and bladder; to a somewhat less degree, the skin and its appendages and the endocrine system, as testicle, thyroid, adrenal, spleen, and thymus; fairly sensitive are the various glandular and lymphatic tissues. The kidney, liver, and nerve tissues are comparatively little hurt, and muscle, connective tissue, and brain are apparently uninjured by practical doses. In pathological processes, an excess of granulation or lymphoid tissue, having been rather recently produced, is quite easily affected. Malignant tissues, being in a state of active reproduction, are very sensitive to radiation, the extent being largely dependent on the type of cell involved. The general effect of continued exposure on all tissues is first stimulating, with very small doses; then inhibitory of all the varied cell activities, especially reproduction; and finally destructive. A dose which would be destructive to proliferating cancer tissue might be only stimulating to its highly resistant connective tissue stroma, thus influencing the tumor favorably in both ways, as connective tissue formation is one of the body's main defenses against malignancy.

The effects on the skin are highly important and must be well understood, for the skin bears the brunt of radiation, receiving the largest percentage of dose in each exposure of all the structures in the line of fire, and the amount of exposure that may be given to deep tissue is sharply limited by the toleration point of the skin. When

it has been exposed beyond this point an inflammatory reaction results, termed "radiodermatitis," "skin reaction," or "X-ray burn." It may be caused by a single intensive dose or be the cumulative result of several minor applications. A variable period of clinical latency occurs after the exposure, from five to seven days, before the reaction appears. This has been explained as the lapse of time between the destruction of the cells' capacity for reproduction and their subsequent natural death. The changes take place largely in the layer of germinating epithelium, that being the place of greatest cell activity.

A first-degree reaction is clinically very similar to an ordinary sunburn, and varies from the slightest pink flush, with no symptoms, to an intense erythema with severe burning and pain. This appears five to seven days after exposure, lasts a week or two, and gradually fades away. Hair on the affected surface usually falls out the first two or three weeks and regrows rather promptly. The second-degree reaction occurs when the erythematous area becomes edematous, vesicles form and break, leaving an exuding eroded surface. Loss of hair is permanent. Subjective symptoms are marked and distressing. The lesion will heal spontaneously in two or three months, leaving the epidermis intact, with probably some atrophy, telangiectasia, and alopecia as sequelæ.

The third-degree burn involves the true skin in the ulcerative and necrotic process. It first appears in one or two days with symptoms of the second-degree reaction. In about three weeks the area becomes black and boardlike, and the part may form a dry gangrenous mass, or leave a deeply ulcerated lesion, the depth depending on the severity of the burn, sometimes involving fascia, muscle, and deeper organs. These burns cause excruciating pain for months, and the reparative power of the tissue seems totally destroyed. Spontaneous healing may never take place, and even with the best of care they seldom are cured before six months and often persist for years. Even when apparently perfect healing occurs there is a strong likelihood of the development of sequelæ of which the milder are atrophy, telangiectasia, alopecia, pigmentation, and keratosis. Late ulceration and the development of X-ray cancer is a frequent end result, and many of the original X-ray operators have finally succumbed to recurrences of that disease. These reactions may occur from one large exposure or repeated small one. A third-degree burn is a horrible catastrophe, causing seemingly endless pain and disability to the patient, and remorse and trouble for the operator.

The avoidance of these unpleasant mistakes is a question of estimating the proper dosage to favorably affect the lesion without injury to the skin, and then making sure the patient gets this dose and no more. These are technical details of interest mainly to the operator.

It is evident that X-ray therapy should be administered only by a medical officer, and one who has had special training in that field under the guidance of an expert. A hospital corpsman should never under any circumstances be allowed to give treatments or do fluoroscopy. The standard of X-ray dosage is the "skin-unit" or erythema dose, which is just enough radiation to cause a slight flushing of the skin. This is obtained by setting the machine and patient so that certain voltage, milliamperage, tube-skin distance, and filtration will result, from which may be calculated the necessary length of exposure for any desired effect. As a practical fact, a full erythema dose should never be given, except in malignancy or other disease where the result is judged to be worth the risk. It is a danger signal, and as such should be avoided. A suberythema dose, repeated after a proper interval, is as effective and safer. In few cases are heavy doses required, however, as most of the work will be done with fractional applications. The toleration of the skin varies with age, sex, color, location of area, circulation, and texture of the skin, the pathological condition present, and whether irritating or strong medicinal agents, massage, or the application of moist or dry heat has been given for quite a time prior to or after the exposure.

The application of X rays to disease may be roughly divided into two general headings—superficial or cutaneous therapy and deep therapy. In the former class the indications, possibilities, and limitations are now quite well established, and the results may be predicted with fairly scientific accuracy. Hazen declares the X rays are the most valuable single remedial agent possessed by the dermatologist. For cutaneous therapy comparatively low voltage, little filtration, and moderate exposure are necessary. MacKee and Andrews give a list of 80 skin diseases amenable to treatment by the X rays.

Detailed discussion of the value of X rays in each skin disease is unnecessary, and only those definitely improved by radiation will be mentioned. Consideration of that class of cutaneous affections due to pathogenic organisms brings up that condition probably most troublesome to naval dermatologists, acne vulgaris. This is very common among the engine-room divisions on oil-burning ships, and often stubborn and advanced cases will be seen around the hospitals, healthy but unfit for duty, sent up in despair by the ship's medical officer after the resources of the Pharmacopœia have been tried in vain over an extended period, and usually ending their naval career by the medical survey and compensation route. These recalcitrant cases are fortunately the most certain of improvement under X-ray treatment, and, if applied and combined with other systemic and hygienic measures of combating the disease,

the percentage of cures will range well over 90 per cent and be accomplished in from one-quarter to one-half the time required for well-applied dermatological treatment. Three or four months is necessary for a thorough course; local applications must be avoided, but the general medical care must not be neglected. Not every case should be radiated; the erythematous types and the mild cases with relatively few lesions will have a better result under the usual general and local treatment, but the promptness and permanency of the results in old indurated and papular cases is one of the most striking achievements of roentgenotherapy. Acne rosacea does not respond well to radiation, and other methods of treatment are indicated. In sycosis vulgaris results range from brilliant to poor. Applied by an expert, complete temporary depilation of the beard is followed by permanent cure, but the technical difficulties and dangers preclude its general use.

In furunculosis striking symptomatic results are gained by intensive radiations of the lesions in restricted areas, usually resulting in regression of the process within 48 hours. General systemic treatment is also necessary. Many authorities, including Ruggles and Dunham, obtained highly satisfactory results and recommended the X ray strongly in these cases. In carbuncles the treatment often gives surprising benefit. Richards says its greatest field is in the large spreading carbuncles of the back and other broad areas, where the patient is highly toxic and sepsis seems imminent. In these patients the X rays should be tried before resorting to radical surgery. Chronic indolent ulcers are often benefited by stimulating doses, and varicose ulcers, granulating surfaces from burns, wounds, or sinuses offer a promising field for mild applications.

The fungus diseases are quite sensitive to the X ray. Tinea tonsurans may almost always be completely cured in one sitting, and no other effective remedy for this disease is known. If this disease gained headway in the Army or Navy, it would be necessary to ray each affected head. The Adamson technique used is quite exacting; its object is to obtain a complete, even, but temporary alopecia of the entire head. Favus of the scalp is treated in the same manner with equally satisfying results. On ringworm infection of the body X rays are not so effective, and the lesions yield easily to local remedies. In actinomycosis and blastomycosis roentgenotherapy has been found superior to any other agent. No cure is known for these conditions, but marked improvement usually follows intensive radiation. Other remedies should not be neglected. Because of the good results in these diseases radiation is recommended in many of the other fungus infections, as sporotrichosis and streptotrichosis.

Among the generalized dermatoses eczema furnishes a wide field for roentgenotherapy. It was one of the first diseases treated by

radiation. Considering the protean nature of its manifestations and the many clinical entities included in the term, it is not surprising to find results ranging from spectacular success to absolute failure. In the forms in which it is indicated, however, the X ray will accomplish more than any other remedy in the dermatologist's possession. The chronic forms, in which the etiology is unknown or obscure, are the ones in which the most striking results are secured. The antipruritic qualities of the rays afford great relief to the patient besides causing regression of the lesion. Localized patches of years' duration will often quickly clear up under intensive radiation. Another common affliction in the service is psoriasis. Rapid involution of the lesions in this disease occurs under judicious exposure, but unfortunately the underlying etiology, whatever it may be, is untouched, and recurrence is the rule. A gradual immunization to the ray appears after several recurrences have been blotted out by it, so that eventually no effect is obtained. However, this is true of all other agents used in the treatment of this disease; and the X rays give quicker and more certain symptomatic effects during the relatively extended period of their efficacy than any other remedy. Lichen planus, though not so common in the Navy, should be mentioned as another generalized eruption greatly benefited by irradiation. Selection of cases and proper medicinal treatment is necessary. Pityriasis rosea, though a self-limited disease, is amenable to roentgenotherapy, and it is claimed the period of eruption may be cut in half by its use.

The analgesic and antipruritic properties of the X rays were early recognized, and it is now well established that they will not only promptly arrest the itching that accompanies such diseases as eczema, lichen planus, neurodermatitis, etc., but will also give quick relief in pruritus independent of any eruption, particularly when of regional distribution. Pruritus ani is greatly benefited, sometimes permanently, in a large percentage of cases. Recurrences are frequent as the etiological factor is not affected, but symptomatic results are far better than other means afford. Considerable discussion has arisen as to the action of the X rays on pain, as in neuralgia, herpes zoster, sciatica, and rheumatism, by direct effect on the sensory nerves. Charlier, Richards, and Leonard, among others, have reported relief from pain in cases of neuralgia, sciatica, and tic douloureux, but MacKee is sceptical as to the presence of any direct nerve action.

Localized hyperhidrosis and bromidrosis are unpleasant, if minor affections, often found in the service, though not so frequently brought to the medical officer's attention. These conditions may be permanently and easily cured by X-ray therapy, and are little changed by any other method of procedure. The exposure produces

atrophy of the sweat and sebaceous glands to the desired degree, and is particularly effective on the feet, hands, and axillæ. Dyshidrosis (pompholyx) is also beneficially affected. The many forms of skin tuberculosis have all been treated by radiation, but a more conservative estimate of its value is being developed since early reports. In lupus vulgaris, roentgenotherapy has not replaced phototherapy in point of efficiency, and the Finsen treatment remains the method of choice. In selected cases, resistant to other agents, the X ray may give good results. In lupus erythematosus the consensus of opinion to-day among dermatologists is that roentgenotherapy in amounts free from unpleasant sequelæ is of little real value. Involution of lesions that have resisted other methods of treatment may be obtained in well-selected cases. However, a trial course of treatments is indicated if phototherapy is not available. The tuberculides in general are, as a rule, benefited by the X rays; tuberculosis verrucosa cutis, scrofuloderma, and related affections as Bazin's disease, sarcoid, and granuloma annulare, are usually much relieved or cured by radiation, according to numerous case reports.

In the hypertrophic lesions and eruptions of the skin the X rays are very successful. The common wart is very susceptible to intensive treatment and a crop will disappear after two or three exposures, without pain, scarring, recurrence, or infection. Good results are had in selected cases of papillomata. The painful and resistant plantar wart (the callositas of naval nomenclature) entirely melts away under proper exposure without the necessity of recourse to surgery. Hard corns of the toes are resistant to the rays and are best attacked by combined surgical, medicinal, X-ray, and prophylactic measures, but the soft variety usually respond quickly. Moles and pigmented warts are not suited to roentgenotherapy. It gives very valuable aid in keloid tissue; small and recent keloidal formations may be cured by simple radiation. Large lesions are best excised, given one treatment, and later radiated two or three times when the first manifestation of keloid evolution recurs. Rhinoscleroma, hitherto intractable, can be permanently cured by X rays, particularly in the early stages. Usually complete cures can be obtained in dermatitis papillaris capillitii. In the congenital ichthyoses and keratoses (Darier's disease, keratosis follicularis, keratoderma palmaris et plantaris) fairly constant but temporary benefit is obtained, but recurrences are usual. Among the various nevi and angiomas, angioma cavernosum is the only variety in which the X rays are successful, the other types being more effectively treated by other methods.

In deep therapy, unfortunately, results are not as clear-cut and certain as in the superficial field. While many gratifying and sometimes spectacular results are obtained, the percentage of re-

sistant cases, even failures, is higher than in cutaneous therapy, and the roentgenologist is not justified in promising too much in the graver diseases referred to him. Much of to-day's work is still in the experimental and empirical stage, due to the very recent development of this type of radiation, and a conservative attitude should be adopted toward the acceptance of new technique or its value in unproved fields until its worth is generally recognized by this branch of the profession. On the other hand, a hidebound scepticism must be avoided, as this specialty is rapidly advancing, usually too fast for the general practitioner to keep abreast of it, and not infrequently older physicians are found who, remembering the many disappointments met in the early days of roentgenotherapy, are prone to condemn its use unqualifiedly as dangerous and of no value, and to scoff at its undoubted and steadily increasing benefits in malignancy. Although guarded statements as to prognosis should be made in treating deep-seated condition, there are many diseases in which the roentgenologist may be confident of benefiting the patient to a marked degree. In some of these, other measures, medicinal and surgical, must be employed jointly with the X ray; in others it is the only effective agent known to offer even temporary respite.

In securing radiation effective in the deep tissues some inches below the skin the principles of X-ray physics must be kept in mind. In superficial therapy, the rays take effect and are absorbed in the first tissue met; in deep treatment the object is to get the absorption further in without harming the skin. This is secured by using higher voltage, giving a larger percentage of penetrating rays in the original beam; by heavy filtration, absorbing practically all the non-penetrating rays which harm the skin without benefiting the deep lesion; by increasing the tube-skin distance, thereby lessening the loss in radiation which the underlying structures suffer by being further from the source of ray than the skin; and by cross-firing through different ports of entry, thus giving the pathological tissue several doses for only one to each skin area used.

Deep therapy may be divided into treatment of benign and malignant conditions. In the former class there are some diseases in which the treatment is still of unproved value; in others the physician is truly negligent who does not recommend for his patient at least a trial of its benefit. Among the latter is Hodgkin's disease. This as yet incurable and almost invariably fatal affection usually regresses very promptly to deep radiation. Of course recurrences are the rule, and in time the effect of the ray slowly disappears; but at least months or years of life and relief from symptoms are granted the patient, which may be obtained from no other sources. A similar situation is found in the leucemias. The blood count falls spec-

tacularly with the first few treatments, but in time rises again, and after many ups and downs finally refuses to respond. The period during which the patient may be kept free of symptoms, however, compares strikingly to the feebleness of the best medicinal methods. The same story occurs in mycosis fungoides. Lesions and symptoms improve and disappear under the X ray, only to recur repeatedly and finally conquer as they gain immunity to radiation.

The endocrine disorders offer a promising but scarcely entered field for roentgenotherapy. Particularly has it recently attracted attention for its uniformly good results in the treatment of hyperthyroidism and exophthalmic goiter. Although surgeons are rather reluctant to admit its value, nearly all cases with this syndrome may be benefited. Inoperable patients in advanced stages may be rendered operable, and surgical cases may be saved operation by its use. It is true failures occur and have caused many surgeons to declare radiation of little value; but case for case, statistics tend to show that the recurrences and failures after operation are about as numerous as those after radiation. No scientific roentgenotherapist claims radiation is a *cure* for hyperthyroidism; they do claim it is a remarkably effective *agent in treatment*.

Although not usually included in naval practice, mention should be made of the wonderful achievements of roentgenotherapy in uterine fibroids, menorrhagia, and delayed menopause. The effects are gained by radiation of the ovaries, and practically all fibrous uterine growths will regress and become symptom-free after a few months' treatment. Contraindications include submucous and pedunculated growths and those with cystic degeneration. With these exceptions, the X ray is the modern method of election for treating these common conditions, and many operations may be saved by a full use of the opportunities afforded by this procedure. In the German gynecological clinics deep therapy has practically superseded surgery in these cases for the last five years or more. The establishment of an artificial menopause when indicated is promptly and certainly accomplished by radiation without the discomforts and dangers of operation and is far superior to any other method.

A field of therapy only developed during the past two years, but which is becoming more and more popular, is the treatment of chronically inflamed and hyperplastic tonsils. Witherbee, of the Rockefeller Institute, first published the results of his work on this condition in 1920, and since then its value has been investigated and confirmed by many other workers. While not supplanting the usual tonsillectomy, it offers an alternative method particularly indicated in heart disease, lymphatic states, hemophilia, and other contraindications to operative procedures. It affects the entire pharyngeal lymphatic ring, including the adenoid tissue, in its action. The

absence of pain, discomfort, hemorrhage, and other unpleasant accompaniments of an operation under either local or general anesthesia will make the method very popular with the patient. By its use the tonsil is left to perform its proper physiological function, but the pathological tissue is absorbed, the buried crypts drained and everted to their normal position, and the ultimate result approaches as near as possible to a normal tonsil. The huge hyperplastic structures seen in many adolescent patients shrink amazingly under treatment and the buried type are rendered practically free from infection. The method in its present development appears so valuable that in future the majority of focal infections in this organ will probably be eradicated by the X ray. Its only apparent disadvantage in naval service is the long time required for the completion of the treatment; about three months is required in comparison with the usual 10 days on the sick list for tonsillectomy cases. However, with the X ray, it is unnecessary to place the patient on the sick list at all, thus saving many sick days in the aggregate. Another indication for tonsillar radiation is found in chronic diphtheria carriers. Hickey has obtained uniformly good results in eradicating the Klebs-Loeffler bacillus from the throat, and the application of the X ray may be found a very useful procedure in dealing with stubborn cases during an epidemic.

In tuberculosis the status of radiotherapy is still unsettled. Generally speaking the radiation of active lesions is dangerous and contraindicated. In chronic or inactive lesions, especially with hyperplasia of lymphatic or connective tissue, the X ray appears to be beneficial; in some conditions it is truly curative. Its most valuable use is in the treatment of tuberculous adenitis. According to Boggs the operation for cervical adenitis should be discarded save for exceptional cases; the modern treatment for this disease should be entirely hygienic and roentgenological, and surgery should be considered contraindicated. It is claimed that 90 per cent of unselected cases of tuberculous cervical adenitis, discharging or not, may be entirely cured by roentgenotherapy alone. These apparently startling statements are accepted by roentgenologists in general, and it seems proper in the face of this evidence that no patient should be submitted to an operation for this condition without a thorough trial of the benefits of radiation. In other tuberculous conditions its value is not so evident. Though many continental therapists recommend its use highly in almost all other forms of tuberculosis, including peritoneal, pulmonary, renal, bone and joint, laryngeal, and skin infections, the attitude in this country is very conservative. Lymphatic involvement is usually very beneficially affected; peritoneal involvement is benefited to a certain degree; possibly occasional cases of bone involvement are improved; reports of success in Addi-

son's disease are found; but direct radiation of lung, kidney, or joint processes are apparent failures. Considerable work of promise is being done with stimulation of defensive bodies and lymphocytes by exposing the spleen, lymph glands, and long bones in these resistant types to minute doses, but its value is still unproved.

In many chronic pathological processes characterized by the formation of unhealthy granulation tissue, the X rays have been applied with varying success. Recommendations by Richards for radiation of chronic otitis media, and by Goosman of postoperative discharging mastoids, suggest a wide field for application in naval practice, where a large percentage of medical surveys are caused by these most intractable cases. If it is found that even a few of these patients will be improved by radiation, it would be worth while to apply it, in conjunction with the usual remedies. All chronic sinuses, including the tubercular variety, which arise in lymphatic or glandular tissue will respond well to stimulating exposure. Fecal and urinary fistulas are unaffected. The results in chronic osteomyelitis have been disappointing, but it is thought that better results will be had with improvement in the estimation of dosage. A field at present being investigated, which will prove very valuable in the naval service if its worth is finally accepted, is the stimulation of fracture union by small doses of the X ray. Good results have been reported by several observers, especially in delayed union not due to mechanical conditions, and it has been stated that the healing time of ordinary fractures may be often cut in half. Opportunities for investigation in this field are frequent in the Navy, and if substantiated, a most important advance in fracture treatment will have been made. Another condition recently reported by Richards to be benefited by radiotherapy is chronic cystitis, particularly that complicating a hypertrophied prostate, and either preceding or following operation. Confirmation of these results will certainly aid the genito-urinary surgeon in handling these difficult cases.

Among many and varied benign conditions for which roentgenotherapy has been recommended, a certain few stand out as being particularly suited for its use, either by reason of the remarkable success attended by its application, or the fact that no other agent is known that will give results. These conditions in which the X ray is almost obligatory will include Hodgkin's disease, leucemia, mycosis fungoides, uterine fibroids, tuberculous adenitis, and selected cases of hyperthyroidism and hyperplastic tonsils. Trial of the X ray is indicated in fractures, chronic cystitis, and otitis media among others. The development of this field of deep therapy is very limited, and in time it will undoubtedly include many other conditions now resistant to treatment.

In the treatment of malignant conditions lies at once roentgenotherapy's greatest triumph, greatest failure, and greatest future. Since the earliest application of the X rays to disease, and with each step in the development of their possibilities, enthusiasts have hailed them as the final discovery of the cure for cancer. No such claim is made by the scientific roentgenologist; no one knows better its sad limitations, and, judged as a "cure for cancer," it would certainly be discarded as an utter failure. All that its exponents desire is a fair hearing; that it be considered as one of the several effective agents at hand for combatting that disease, and used in conjunction with them to its fullest extent. That the patient often ultimately succumbs to the affection should no more cause the profession to discard radiation than that we should cease operating on malignancy because, in an equal percentage of cases, the patient will die sooner or later in spite of the operation. The months or years of life gained for the inoperable sufferer, the relief of pain and distressing local symptoms, which so frequently follow efficient roentgenotherapy, are sufficient justification for its widespread use, even if not one case was saved from a fatal outcome.

However limited the final results to-day, with what hope can the future possibilities of attacking the cancer problem be contemplated? Modern roentgenotherapy, dating from the introduction of the Coolidge tube, is only 8 years old; yet the strides made by it since then have already practically revolutionized the treatment of malignancy whether surgical or otherwise. The failures of the X ray are mainly due to technical difficulties, which prevent our reaching all the tumor cells with the necessary dose; one by one these difficulties are being overcome and greater efficiency obtained. An agency with a specific action on malignant tissue is at hand in the X ray; the fact that we are at present unable to reach all the pathology with this agent is no criterion of its future range of effectiveness. In former days none of the syphilitic lesions of the central nervous system were reached by salvarsan, but now some of them are yielding to more effective modes of its use, as in the form of salvarsanized serum, and ventriculopuncture, and still greater efficiency may be predicted for it. Quinine is none the less specific against malaria because it fails to reach the organisms hidden in the brain and spleen of chronic cases. So also the specific action of the X ray on malignant cells is not disproved because with our present comparatively feeble and undeveloped technique we are unable to entirely eradicate every pathological cell protected from effective dosage by dense tissue, delicate surrounding organs, and sensitive overlying skin.

The difficulties of deep therapy in malignancy are the subject of concerted attack by roentgenologists, biologists, and physicists the

world over. Probably more work is done and more pages printed on this question than on all the other fields of roentgenology combined. Even so there is a wide variance among roentgenotherapists in technique, indications, cooperation with the surgeon, and results. However, certain theories of action and methods of attack are fairly well standardized as a basis for future investigation. It was formerly considered that for carcinoma and sarcoma cells a definite "lethal dose" existed, and once each cell received this certain amount of radiation it would die and the tumor be entirely destroyed, thus recalling the original "magna sterilisatio" theory of Ehrlich in regard to salvarsan in syphilis. Unfortunately, each tumor has its own individual sensitivity to radiation and the dose needed to actually destroy its component cells is not only impossible to ascertain, but impossible to give from a practical standpoint without serious damage to neighboring normal tissue. However, the benefits of radiation are obtained without necessitating the attainments of this hypothetical lethal dose because of the specific selective action on the malignant cell due to its state of active reproduction; and the more malignant the cell, the greater this increased susceptibility. This specific action on tumor tissue occurs in two ways, according to Fischer and Holthusen, of Berlin, and Ewing, of New York. Though the cells themselves may not be actually destroyed, their capacity for reproduction is inhibited; and the defenses of the body, particularly the surrounding connective tissue, the phagocytic white cells, and the complicated reactions of immunity, are stimulated to high activity.

It may be pointed out that in relation to naval practice the question of carcinoma therapy is more or less academic, as the commoner tumors met with in the service, those of the stomach and digestive tract, are the ones least amenable to roentgenotherapy. Despite this fact cancer is cancer, and an agent that will cure malignancy of the uterine cervix will undoubtedly in time be successfully applied later to other parts of the body. Thus a résumé of the present status of the X ray in specific tumors and locations will serve to give a clearer idea of what may be expected from it in the future.

The greatest success of roentgenotherapy at present lies in the treatment of the basal cell epitheliomata. In these tumors the complete and permanent cures range from 90 per cent in unselected cases to nearly 100 per cent in selected cases by the use of the X rays alone. Combined with radium and excision with electrocoagulation or cautery, the rays are more effective even in late and metastatic cases. MacKee has prepared many tables of the end results of these cases treated by radiation and by surgery, and concluded that the

results from radiation alone are equal if not better than from those treated surgically. The prickle cell and squamous cell epitheliomata, he states, are more potentially dangerous and less amenable to radiotherapy, and though the X rays are curative in early selected cases, a combination of radium, X ray, and surgery is recommended in well-developed lesions. In carcinoma of the lip, tongue, mouth, and esophagus radium is the agent of choice for the local lesion, reinforced by intensive radiation of the tumor from the outside together with the lymphatic areas where metastases may have occurred. Surgical excision should be limited to selected cases as the danger of producing metastases in a near-by lesion is very great. Pfahler has reported most excellent results with apparently permanent cures in these cases by local removal of the tumor mass by electrocoagulation or surgical diathermy, followed by radium locally and generous irradiation by X ray of all the neighboring structures to seal the lymph channels. There is an increasing use of surgical electricity in all tumor excisions, as it permits removal of the mass without danger of spreading the loose cells through newly opened lymphatics.

In the university gynecological clinics at Erlangen and Freiburg, Germany, no surgical operations for uterine carcinoma have been done during the past five or six years. Intracervical radium applications combined with intensive radiation with the new 280-kilovolt apparatus, with copper filtration through many ports of entry, front and back, have apparently been attended with sufficient success to convince them that surgical interference in these cases is unwarranted. Though such a radical view has not generally been adopted in this country, the results of combined radiotherapy, with or without operation, are highly gratifying, and permanent cures are being reported in from 10 per cent to 40 per cent of cases. As five years without recurrence is considered the minimum time necessary to determine a permanent cure, it is evident present figures do not include results from the new apparatus and technique, which, judging from immediate results, is considerably more effective than the old. In mammary carcinoma, the procedure recommended at present is pre-operative radiation, followed in a few weeks by radical operation, and then two or three postoperative courses of intensive exposure. Inoperable cases may be rendered operable by generous X-ray treatment, or at least may be greatly benefited; the local ulcerations may be healed and the regression of tumor growth effected, thus prolonging and making life more comfortable even if recurrent metastases cause a fatal termination. Carcinoma of the thyroid, prostate, or penis should be treated by combined surgery, X ray, and radium. In the Mayo clinic it was found that one-third of the prostate cases had already metastasized at the time of diagnosis, thus permitting only

palliative treatment. In selected cases, however, much good and occasional cures were affected by the combined methods.

In the carcinomata of the stomach, intestine, and rectum little can be done by radiation. This is largely due to the presence in the field of exposure of extremely ray-sensitive organs; the adrenals and the mucosa of the small intestine, rectum, and perhaps bladder are badly injured by rays in sufficient quantity to affect the tumor cells. "Radiation sickness," occurring after deep therapy of the abdomen particularly, is probably caused by effects on these structures. Warren and Whipple found complete exfoliation of the lining of the small intestine in dogs exposed to heavy doses, who died apparently from an extreme degree of the "ray sickness." Some results in stomach carcinoma have been reported from Germany, where the adrenals and jejunum were avoided by cross-firing in an oblique plane upward and backward. Beneficial results in cancer of the pancreas are recently reported by Richards. In malignancy of the bladder the X rays play a secondary part; intracystic removal of the tumor by fulguration or other electrical means is followed by radium implantation and radiation over both front and back to the limit of toleration of the bladder epithelium. In the treatment of sarcoma, results ranging from cures to failures are had from the X ray. The type of tumor cells seems to determine the success obtained. The most striking results are found in the exceedingly malignant small round cell, or lymphosarcomas, in which surgery is only palliative at best. To a less degree the small spindle cell and giant cell tumors are benefited. Schroeder reports that roentgenotherapy is preferred to excision in many of the German clinics. The osteo and fibro sarcomata are very resistant to radiation, as are all other slow-growing tumors of this type. Metastatic tumors and recurrences, either of carcinoma or sarcoma, are usually benefited by intensive therapy to a greater or less degree, according to location and the type of cell involved. Lymphatic metastases are quite responsive; those in bone practically unaffected. In these secondary growths, local cessation and often regression of growth occurs, but is usually only temporary, the process breaking out in another less vulnerable locality. However, the palliative power of radiation is remarkable and is always indicated even in the advanced cases.

In conclusion, it may be said that roentgenotherapy of malignancy is in its infancy. In a very few types radiotherapy may replace surgery. In operative cases the procedure of choice is preoperative radiation, radical excision, and repeated postoperative exposure. Radium and surgical electricity must be used when indicated. In inoperable, recurrent, and metastatic cases the X ray often does great good by lessening symptoms and prolonging life.

SUMMARY.

1. Roentgenotherapy has a wide range of usefulness which is not yet applied to its fullest extent in naval practice.

2. While the necessary X-ray equipment is at hand in most naval hospitals, lack of special training of the operator very frequently forbids its use in the treatment of disease.

3. Limitations and possibilities of cutaneous therapy are now well established, and cases in which it is indicated should be recognized and referred to the roentgenologist by the medical officers afloat.

4. Deep therapy is a comparatively new field, and application of it to new diseases is constantly occurring. The competent roentgenologist is justified in applying it experimentally in various pathological conditions. The technique is more exacting and the dangers greater.

5. X-ray treatment of malignancy at present offers comparatively little to the naval medical officer, but, with radium, it is destined to be of primary importance in the suppression of those conditions.

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COMPOSITION, EQUIPMENT, ORGANIZATION, AND OPERATION OF THE MEDICAL DEPARTMENT FOR THE SPRING EXERCISES OF THE MARINE CORPS EXPEDITIONARY FORCE, 1922.

By C. A. COSTELLO, Lieutenant, Medical Corps, United States Navy.

The idea of organizing an independent unit composed of medical personnel was first suggested by Lieut. Walter A. Vogelsang, Medical Corps, United States Navy, following the maneuvers of the Marine Corps at the Wilderness in the fall of 1921. Using the Army organization table of a medical regiment for a guide, he reduced the regiment as shown on the table to a battalion, changed the titles of the commissioned and enlisted personnel to Navy titles and submitted it to Marine Corps Headquarters and the Bureau of Medicine and Surgery, where the plan met with immediate approval, and

except for the addition of a marine service company under the command of a marine officer was adopted without change.

About two months previous to the spring exercises of the Marine Corps Expeditionary Force at Gettysburg, the writer was designated to work out a scheme of organization and operation for a battalion of this character, and later to train, equip, and act as its executive officer.

After consulting the available literature on recent Army medical organization the following plan was developed, and became the basis on which the Medical Department functioned during the maneuvers:

The Medical Department participating in the spring exercises of the Marine Corps Expeditionary Force will be divided into two distinct units, designated as:

(a) The medical battalion (a unit made up of medical personnel functioning independently of the line organizations, but in conjunction with them).

(b) The attached medical troops (medical personnel serving with the line organizations).

The medical battalion will be under the command of the force surgeon who will be a member of the General Staff acting directly under the commanding general and will be responsible for all medical activities of the force.

The medical personnel of the Force is organized as follows (see diagram) :

MEDICAL BATTALION.

ORGANIZATION.	FUNCTION.
Battalion headquarters-----	Force surgeon's office and headquarters of the Medical Department.
1 service company, United States Marine Corps.	Furnishes transportation, mechanics, chauffeurs, drivers, cooks, rations, fuel, and other supplies.
1 sanitary company-----	Supervision of sanitation of area, collection of sick and disabled on the march and in camp.
1 ambulance company-----	Collection and transportation of sick and disabled.
1 hospital company, divided on the march into two échelons.	Temporary hospitalization and treatment of men within the Force.
1 medical supply company-----	Transportation and issue of medical and dental supplies.

Battalion Surgeon's Headquarters.*Composition.*—

- 1 commander, Medical Corps, United States Navy, force surgeon, commanding.
- 1 lieutenant, adjutant, and sanitary inspector.
- 1 pharmacist.
- 1 chief pharmacist's mate.
- 2 lower Hospital Corps ratings.

Transportation.—

- 1 horse, riding.
- 1 motor car.
- 1 motorcycle with side car.
- 1 bicycle.

Tentage.—

- 1 tent, 14.4 by 14.6, office.
- 3 tents, wall.

Equipment.—

- 1 field desk.
- 1 typewriter.
- 1 typewriter case.
- 2 chairs, folding.
- 2 stools, folding.
- 4 cots, folding.
- 4 nets, mosquito.
- 6 lanterns, white globe.

Administration.—The force surgeon will keep in close touch with the commanding general, consult with the chief of staff, and establish close relations with F-1, F-3, and F-4, in order that he may be familiar with the general plans of the organization, and advise with them on matters which pertain to the Medical Department.

The force surgeon will be responsible for the general sanitation of the brigade and will submit reports of same to the commanding general.

He will control all movement and station of the Medical Department units and direct the collection, transportation, and hospitalization of the sick and disabled.

Medical and dental supplies will be issued to the various medical units only on his approval.

All Medical Department orders, reports, forms, requisitions, etc., will emanate from the force surgeon's office.

The sanitary inspector will accompany the quartering party and make a general survey of the various camp sites.

Recommendations to the quartering officer as to water supply, drainage, soil, vegetation, etc., as well as the location of the force medical units, will be made during this survey.

On the march.—The force surgeon will march with the commanding general as a member of his staff.

The equipment of the force surgeon's headquarters will be carried by the medical supply section.

In camp.—Medical headquarters will be located in close proximity to force headquarters and will function as a part thereof.

The Sanitary Company.

Composition.—

- 1 lieutenant, Medical Corps, in command.
- 1 chief pharmacist's mate.
- 2 pharmacist's mates, first class.
- 2 pharmacist's mates, second class.
- 30 lower Hospital Corps ratings.

Transportation.—

- 1 horse, riding.
- 2 trucks, 3/4 ton, cargo.
- 1 trailer, kitchen.
- 1 trailer, tank, 300-gallon.
- 1 motorcycle with side car.
- 2 bicycles.

Tentage.—

- 1 tent, store, 14.4 by 14.6.
- 2 flies, tent, 14.4 by 14.6.
- 2 tents, wall.

Equipment.—

- 2 cots, folding.
- 2 nets, mosquito, cot.
- 4 stools, folding.
- 6 lanterns, white globe.

Tools, litters, and articles for use in sanitation.

Administration.—The commanding officer will have frequent conferences with the force surgeon, will establish close relations with the commanding officer of the Ambulance Company, and will be thoroughly familiar with daily plan of operations. He will keep in touch with the regimental surgeons and be ready to render assistance to them if necessary. He will aid in the supervision of the sanitation of the camp site and establish march collecting stations.

On the march.—The foot troops of the Sanitary Company will ordinarily march at the tail of the Infantry column.

The motor transportation of the company marches with the motor section of the train.

The Sanitary Company will provide the personnel and equipment for the march collecting stations on the route of the march.

These stations will be located about 3 miles apart (or at each hourly halt), in some sheltered spot, with a petty officer in charge, and plainly marked by a Red-Cross guidon.

Method of establishment.—Each day the requisite number of squads for the establishment of the march collecting stations for the contemplated day's march will be detached from the Sanitary Company, with necessary equipment, and march at the tail of the advance guard. At each hourly halt one squad will drop out and establish a collection station at a suitable site, where the casualties collected during the march by the animal-drawn ambulances will be evacuated for further transportation by motor ambulances to the field hospital in the rear.

After all patients have been disposed of the station will be closed and the squad will rejoin its company at the tail of the Infantry column. A motor ambulance may be used for this purpose.

In camp.—The Sanitary Company will construct the latrines for the medical battalion in both the march and permanent camp sites.

The Sanitary Company will furnish details for sanitation purposes, to supervise the examination and chlorination of the water supply, disposal of waste, manure, incineration of garbage, and the proper construction and policing of latrines.

The Ambulance Company.

Composition.—

- 1 lieutenant, Medical Corps, in command.
- 1 chief pharmacist's mate.
- 19 lower Hospital Corps ratings.
- 10 chauffeurs.
- 4 drivers.
- 1 mechanic.

Transportation—

- 1 horse, riding.
- 10 ambulances, motor.
- 4 ambulances, animal drawn.
- 1 motor cycle with side car.

Tentage.—2 tents, wall.

Equipment—

- 1 desk, field.
- 2 nets, mosquito, cot.
- 4 stools, camp.
- 2 cots, folding.
- 4 lanterns, white globe.

Administration.—The commanding officer will have frequent conferences with the force surgeon and establish close relationship with the commanding officer of the Sanitary Company and the Hospital Company. He must at all times keep informed as to conditions in

the front and in the rear of the column in order that he may render assistance with as little delay as possible. He will be responsible for the evacuation of all patients from the collecting stations and regimental infirmaries to the field hospital and from the field hospital to the base hospital.

On the march.—The motor section of the Ambulance Company will march in advance of the train but *always in the rear* of the combatant troops. Animal-drawn ambulances will march in the rear of the Infantry column, collect all casualties, and carry them to first collecting station.

Ambulances detailed with the field hospital for evacuation purposes will temporarily become a part of that unit.

Ambulances may not be detailed for any special duty when the transportation of the sick is required.

All details of ambulances for any special duty must first be approved by the force surgeon.

Each ambulance should be equipped with 1 Thomas arm splint, 1 Thomas leg splint, 2 litters, water, blankets, and small supply of first-aid matériel.

In camp.—Furnish transportation for sick or disabled to rail head, base hospital, or field hospital.

Ambulances will be parked in groups in the area designated for that purpose.

A guard will be regularly posted over the ambulance parking area.

Hospital Company.

Composition—

- 1 lieutenant commander, Medical Corps, United States Navy, in command.
- 5 lieutenants, one of whom is a dental officer.
- 1 warrant officer.
- 2 chief pharmacist's mates.
- 2 pharmacist's mates, first class.
- 4 pharmacist's mates, second class.
- 47 lower Hospital Corps ratings.

And the following marines—

- 1 sergeant (mess).
- 3 cooks.
- 4 chauffeurs.
- 1 mechanic.

Transportation—

- 4 trucks, 3-ton.
- 1 trailer, kitchen.
- 1 trailer, tank, 300-gallon.
- 1 motorcycle with side car.
- 1 bicycle.

Tentage—

20 tents, hospital ward, 14.4 by 14.6.

5 tents, wall.

2 flies, 14.4 by 14.6.

Equipment—

1 field hospital, United States Army, complete.

10 cots, folding.

10 stools, folding.

10 nets, mosquito, cot.

1 flag, Red Cross, 28 by 16 inches.

20 lanterns, white globe.

1 lantern, green globe.

Administration.—Company headquarters will be divided into two distinct parts:

(a) Company office, for administration of the tactical activities of the unit.

(b) Hospital office for the administration of medical functions of the unit.

The warrant officer attached will act as adjutant, and the dental officer will be available for all routine work.

On the march.—On the march the company will be divided into two echelons, each one capable of functioning independently of the other, and designated as section No. 1 and section No. 2.

These sections will set up on alternate night halts, section No. 1, setting up first, will care for all casualties collected on the day's march and will remain set up during the following day to care for casualties of that day's march except those collected at the last collecting station which will be cared for by section No. 2.

Section No. 2 will care for all patients of the night and the casualties of the following day's march except those of the last collecting station, which will be cared for by section No. 1.

Section No. 1, after having evacuated all its patients, will break camp and overtake the troops in time to set up for the night halt.

This procedure of "leap frog" will be repeated until permanent camp is reached, when the two sections will again be combined into one hospital unit.

The base hospital will be the United States Naval Hospital, Washington, D. C., and all cases incapacitated for further participation in the maneuvers will be evacuated as soon as possible, either by ambulance or rail. Those who, after observation and treatment, will be able to return to duty within a reasonable length of time will be evacuated forward by ambulance to the section of the hospital nearest the combatant troops.

The motor section of the Hospital Company will march in the rear of the motorized section of the train.

In camp.—In march camp sites one section will be set up at all times.

In permanent camp both sections will combine and establish a complete field hospital.

The field hospital will provide for hospitalization, observation, and evacuation of the sick.

Regulation forms will be made out for each patient. History sheets will be used instead of health records.

The regular hospital routine will be established in the separate sections and combined unit.

The field hospital will be designated by a Red Cross flag in day time and by a green over a white light at night.

Marine Service Company.

Composition—

- 1 lieutenant, United States Marine Corps, in command.
- 1 warrant officer, United States Marine Corps.
- 1 first sergeant (acting).
- 1 sergeant (clerk).
- 17 chauffeurs.
- 1 clerk.
- 4 cooks (cooks for battalion and patients).
- 2 cooks, assistant (battalion and patients).
- 4 drivers.
- 3 mechanics.

Transportation—

- 2 trucks, 3-ton, cargo.
- 1 motorcycle with side car.
- All transportation furnished by the United States Marine Corps and assigned to the various companies.
- 2 tents, wall.

Equipment—

- 1 field desk.
- 1 typewriter.
- 1 case, field, typewriter.
- 1 tool chest.
- 2 cots, folding.
- 4 stools, camp.
- 4 lanterns, white globe.

Mess gear.

Administration.—The commanding officer will be a member of the force surgeon's staff and will act directly under him. He will be responsible for the vehicles used in transporting the medical battalion and will supervise the feeding of the troops and patients. He will be in direct command of all Marine Corps personnel and

will establish close relations with the commanding officers of the Sanitary Company, Ambulance Company, and Hospital Company, and be ready to render assistance to them when necessary. He will handle all ration accounts and procure rations for the battalion including patients.

On the march.—The rolling kitchen and kitchen force assigned to the Sanitary Company will be temporarily attached to the Hospital Company.

The rolling kitchens and the kitchen force will be divided into two sections, one with each section of the field hospital.

The section nearest the combatant troops will mess the Battalion Headquarters, Sanitary Company, Ambulance Company, Medical Supply Company, and the echelon of the field hospital to which it is attached.

The section attached to the echelon of the field hospital in the rear will mess the personnel and patients of that unit.

The sections of the kitchen force will alternate position in company with the echelon of the field hospital to which they are attached.

In camp (permanent)—

The Battalion Headquarters, Medical Supply Company, Sanitary Company, Ambulance Company, and Marine Service Company will mess together.

The Hospital Company and patients in the field hospital will be fed in the hospital mess.

The personnel will camp with the other units of the medical battalion.

Medical Supply Company.

Composition—

- 1 chief pharmacist's mate.
- 2 lower Hospital Corps ratings.

Transportation—

- 1 truck, $\frac{3}{4}$ -ton.

Tentage—

- 1 tent, hospital ward, 14.4 by 14.6.
- 1 tent, wall.

Equipment—

- 1 cot, folding.
- 2 stools, folding.

Administration.—The Medical Supply Company will transport and issue all medical supplies for the force.

Supplies will be issued only on a regular requisition approved by the force surgeon.

Regular issue hours will be established, but emergency requisitions may be drawn at any time.

On the march.—The Medical Supply Company will march at the head of the motor section of the Sanitary Company.

In camp.—The Medical Supply Company will be located close to the force surgeon's headquarters and will function as a part thereof.

ORGANIZATION TABLE NO. 18.—*Medical battalion—for independent Infantry brigade U. S. M. C.*

	1	2	3	4	5	6	7	8
	Units.	Force surgeon's headquarters.	Service company—administrative.		Sanitary Company.	Ambulance Company.	Hospital Company.	Total battalion.
			Medical supply.	Marine service.				
2	Medical officers:							
3	Commander, U. S. Navy...	1						1
4	Lieutenant commander or lieutenant, U. S. Navy...	1 ^a					1	2
5	Lieutenants (or lieutenants junior grade), U. S. Navy...				1	1	5 ^d	7
6	Marine officer, lieutenant...			1 ^g				1
7	Total commissioned...	2		1	1	1	6	11
8	Warrant officers, U. S. Navy...	1					1	2
9	Warrant officers, U. S. Marine Corps...			1 ^b				1
10	Total warrant officers...	1		1			1	3
11	Enlisted medical personnel...	3	3		35	20	55	116
12	Chief pharmacist mates...	(1)	(1)		(1)	(1)	(2)	6
13	Pharmacist mates, 1st class...				(2)		(2)	4
14	Pharmacist mates, 2d class...	(1)			(2)		(4)	7
15	Lower ratings...	(1)	(2)		(30)	(19)	(47)	99
16	Enlisted U. S. Marine Corps personnel...			33				33
17	1st sergeant (acting)...			(1)				1
18	Sergeants...			(1 ^e)				1
19	Privates...			(27)				27
20	Chauffeurs...			(17)				17
21	Clerks...			(1 ^e)				1
22	Cooks...			(4 ^f)				4
23	Cooks, assistant...			(2 ^f)				2
24	Drivers...			(4)				4
25	Mechanics...			(3)				3
26	Total enlisted...	3	3	33	35	20	55	149
27	Aggregate...	6	3	35	36	21	62	163

REMARKS.

(^a) Executive officer. (^b) Supervises transportation. (^c) Mess and miscellaneous duties. (^d) Includes one dental surgeon. (^e) Clerk. (^f) Cooks for battalion and patients. (^g) Assistant to executive and administrative duties not requiring medical knowledge, commands marines.

Table showing equipment to be furnished by the Marine Corps:

	1	2	3	4	5	6	7	8
	Units.	Force surgeon's head-quarters.	Service company—administrative.		Sanitary Company.	Ambulance Company.	Hospital Company.	Total battalion.
			Medical supply.	Marine service.				
28	Horses, riding.....	1			1	1		3
29	Horses, draft.....					12		12
30	Total animals.....	1			1	13		15
31	Ambulance, motor.....					10		10
32	Ambulance, animal-drawn.....					4		4
33	Trailers, tank, 300-gallon.....				1		1	2
34	Trailers, kitchen.....				1		1	2
35	Trucks, $\frac{1}{2}$ -ton cargo.....		1		2			3
36	Trucks, 3-ton cargo.....			2			4	6
37	Cars, motor, medium.....	1						
38	Cars, reconnaissance.....						1	1
39	Motor cycles and side cars.....	1		1	1	1	1	5
40	Bicycles.....	1			2		1	4

ATTACHED MEDICAL TROOPS.

The attached medical personnel is composed of detachments assigned to the regiments and separate battalions and function with their organizations as a part of them under direct command of the organization commanders.

The attached medical troops provide the medical service for the regiments to which they are assigned and are divided within their respective organizations into regimental headquarters and battalion sections.

Infantry Regiment.

Medical personnel—

- 1 lieutenant commander, regimental surgeon.
- 3 lieutenants, battalion surgeons.
- 1 chief pharmacist's mate.
- 31 lower Hospital Corps ratings.

Transportation—

- 1 horse, riding.

Tentage—

- 1 tent, wall, dispensary.
- 1 tent, wall, office.
- 2 tents, wall, regimental and battalion surgeons.

Equipment—

- 6 chests, medical and surgical.
- 6 machine-gun carts.
- 1 field desk.
- 1 typewriter.
- 1 case, typewriter.
- 4 cots, folding.
- 4 nets, mosquito, cot.
- 8 stools, folding.
- 1 Red Cross flag, 28 by 16 inches.
- 1 lantern, green globe.
- 4 lanterns, white globe.

Artillery Regiment.*Medical personnel—*

- 1 lieutenant, regimental surgeon.
- 2 lieutenants, battalion surgeons.
- 1 chief pharmacist's mate.
- 17 lower Hospital Corps ratings.

Transportation—

- 1 horse, riding.

Tentage—

- 1 tent wall, dispensary.
- 1 tent wall, office.
- 1 tent wall, regimental surgeon.
- 1 tent wall, battalion surgeons.

Equipment—

- 4 chests, medical and surgical (to be carried on trailers).
- 1 field desk.
- 1 typewriter.
- 1 case, field typewriter.
- 3 cots, folding.
- 3 nets, mosquito, cot.
- 7 stools, folding.
- 1 Red Cross flag, 28 by 16 inches.
- 1 lantern, green globe.
- 4 lanterns, white globe.

Air Squadron.*Composition—*

- 1 lieutenant, flight surgeon.
- 1 pharmacists's mate, first class.
- 3 lower Hospital Corps ratings.

Transportation—

- 1 motor cycle with side car.

Tentage—

- 1 tent, wall, office.
- 1 tent, wall, dispensary.
- 1 tent, wall, flight surgeon.

Equipment—

- 2 chests, medical and surgical.
- 1 field desk.
- 1 typewriter.
- 1 case, field, typewriter.
- 1 cot, folding.
- 1 net, mosquito, cot.
- 5 stools, folding.
- 1 Red Cross flag, 28 by 16 inches.
- 1 lantern, green globe.
- 3 lanterns, white globe.

Force Headquarters and Engineer Battalion.

Composition—

- 1 lieutenant, regimental surgeon.
- 1 lieutenant, battalion surgeon.
- 1 chief pharmacist's mate.
- 13 lower Hospital Corps ratings.

Transportation.—

- 1 riding horse or motor cycle with side car.

Tentage.—

- 1 tent, wall, office.
- 1 tent, wall, dispensary.
- 1 tent, wall, regimental and battalion surgeon.

Equipment.—

- 4 chests, medical and surgical.
- 4 machine-gun carts.
- 1 field desk.
- 1 typewriter.
- 1 case, field, typewriter.
- 2 cots, folding.
- 2 nets, mosquito, cot.
- 6 stools, folding.
- 1 Red Cross flag, 28 by 16 inches.
- 1 lantern, green globe.
- 3 lanterns, white globe.

On the march.—The regimental surgeon will march with the regimental commander.

Each battalion surgeon will march at the rear of his respective battalion and should occasionally go forward to observe the condi-

tion of the troops of his command and also to confer with the battalion commander in order to keep informed as to any changes in march conditions.

The enlisted medical personnel attached to the Infantry battalions will march at the rear of their respective battalions.

The enlisted personnel of the motorized units will be distributed on the various vehicles which make up the command.

Disposition of Casualties.

Cases, sick or disabled, will be sent to the battalion surgeon in rear, who will dispose of them as conditions warrant, either requiring them to continue the march under his observation or to be placed in collecting ambulances for disposal at the collecting station.

When the casualties are turned over to the collecting ambulances the men should be tagged if possible and their equipment transferred with them.

In motorized units casualties may be carried on any available transportation until the collecting station is reached.

Whenever a case is disposed of a record should be made, showing the man's name, organization, and company, and if possible a diagnosis for the information of the organization commander and regimental surgeon.

Temporary dressings may be made at each hourly halt and if a man is disabled he may be turned over to the collecting station.

In camp.—The regimental surgeon will establish an office for the medical headquarters of the regiment in the area allotted for that purpose.

The attached medical personnel will camp as a unit and mess with the companies to which attached.

Each regiment will establish a dispensary for the observation, treatment, and disposition of sick within the organization.

The regimental dispensary will be marked by a Red Cross flag by day and by a white over a green light at night.

Sick call will be held at the regimental dispensary at a designated hour, and a morning sick report forwarded to the commanding officer and the force surgeon.

Cases transferred to the field hospital will be accompanied by a history sheet, with the diagnosis and history written up. A Form F, rough, will be made in all cases.

Sanitary inspections of latrines, incinerators, and dumps will be made daily after routine police work is finished.

A battalion surgeon will be detailed as regimental officer of the day and sanitary inspector of the regimental area.

A final inspection of the abandoned camp site will be made by the regimental surgeon before beginning the day's march.

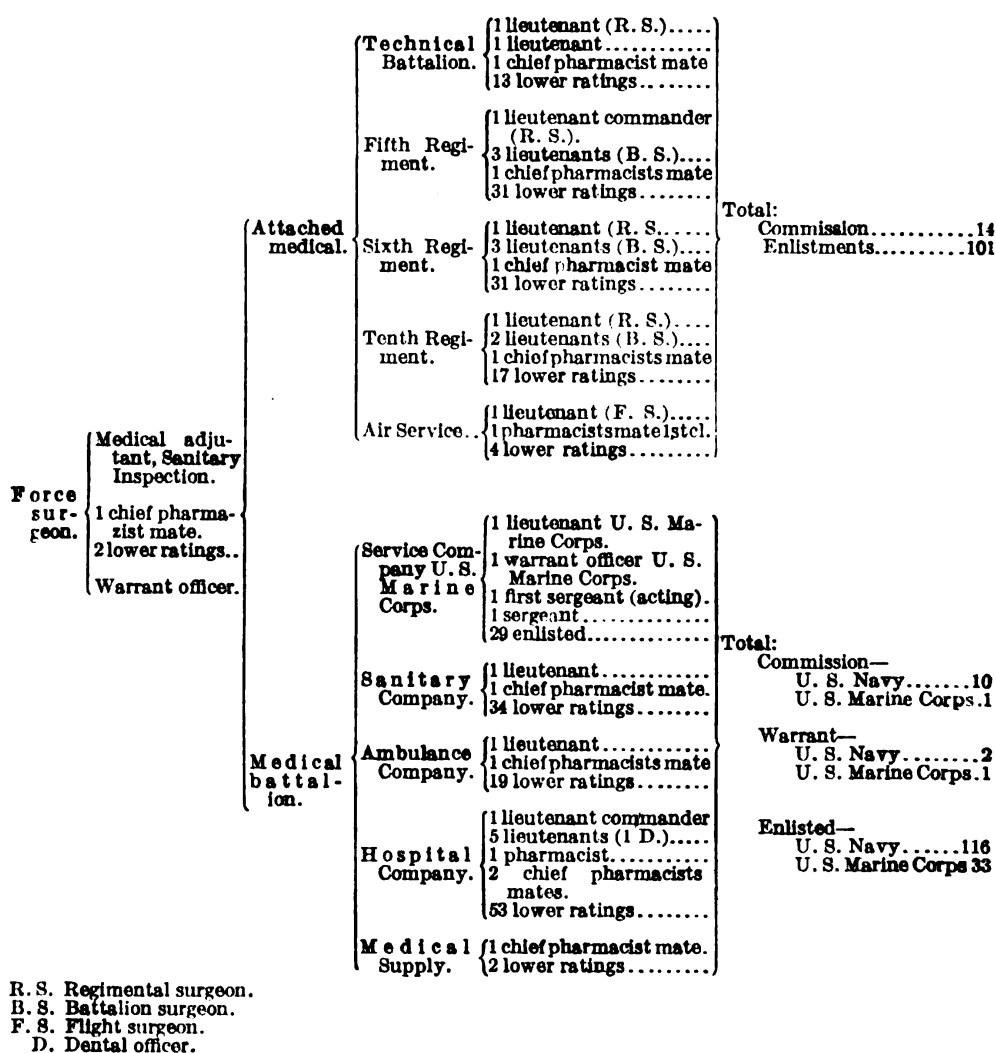
Each regiment will form a sanitary squad to supervise the disposal of waste, policing of latrines, and general sanitation of the area.

Arrangement should be made for the administration of venereal prophylaxis at the regimental dispensaries.

Battalion medical and surgical chests will be parked in groups at the regimental dispensary for common use.

The accompanying diagram shows graphically the organizations participating in the exercises, the distribution of the medical personnel and their relative coordination under the command of the force surgeon.

DIAGRAM OF ORGANIZATION OF MEDICAL UNITS.



A few minor changes were made in the original tables, such as the addition of a medical supply section, which had not been included, changing the name of the Marine Supply Company to

Marine Service Company in order to distinguish it from the medical supply, and a change in the titles of the commissioned personnel to conform with that of the officer assigned to the various units.

When actual loading was attempted, the motor transportation allotted was found to be inadequate, so two additional 3-ton "Quad" trucks were procured, and as no provision had been made for transportation of the officers of the Hospital Company and the headquarters section a reconnaissance car was assigned for that purpose.

Three animal-drawn ambulances were borrowed from the Army to be used as collecting wagons, and the number of motor ambulances was increased from 6 to 10, 7 heavy Army type and 3 light Ford type, to be used within the various camps over rough ground, where there were no roads, and where the heavier machines would be practically unable to travel, especially in wet weather.

The whole medical train consisted of one touring car for use of the force surgeon, one White 12-passenger reconnaissance car, four F. W. D. 3-ton trucks, two 3-ton "Quad" trucks, three White $\frac{3}{4}$ -ton trucks, two 300-gallon water tank trailers, two kitchen trailers, ten motor ambulances, and three animal-drawn collecting wagons. The cargo trucks constituted section No. 4 of the force train, the motor ambulances were permitted to run free, and the animal-drawn wagons followed the tail of the Infantry.

The commissioned personnel was comprised of medical officers on duty at Quantico and a class from the Naval Medical School. The enlisted force was drawn from the Hospital Corps school at Norfolk, the naval operating base at Hampton Roads, and the various departments on the post.

The Army field hospital was of an old type which had been used once before during the maneuvers at the Wilderness. The equipment consisted of a complete set-up for a complement of 78 patients. Many articles, such as cots, blankets, sheets, towels, pajamas, etc., lost in previous handling had to be replaced, and all the cases and crates were in poor condition and had to be repaired.

Tentage was obtained from the Marine Corps, as no canvas was included in the equipment. The old style hospital tent, dimensions 14.4 by 14.6, was chosen because it was the only kind available that was suitable for the purpose. The wall tents, field desks, typewriter cases, cots (for officers), stools, mosquito nets, machine-gun carts, etc., were all quartermaster property.

Medical supplies for the attached troops were drawn from the post medical storeroom, and the battalion medical and surgical chests (wooden boxes, 30 $\frac{1}{2}$ inches long, 18 inches wide, and 19 inches high, with a hinged cover, handles on either end, painted green and lettered "Medical chest" or "Surgical chest" according to the contents) were supplied by the naval medical supply depot.

The chests contained one expeditionary medical case and one expeditionary surgical case, respectively, with additional medical and surgical supplies recommended by a board convened to revise the supply table for future expeditionary service. These chests were mounted on two-wheeled pneumatic-tired machine-gun carts, with a regulation Army litter fastened underneath the tongue and drawn by the hospital corpsmen attached to the battalion.

A regulation first-aid pouch or a surgical dressing pouch was carried by each petty officer and squad leader in addition to his regular field equipment.

The Medical Department functioned for the entire 24 days of the exercises, absolutely independent of any outside aid whatsoever, participated in every problem and maneuver, was never delayed, held its position in the train, and was usually the first unit to be set up and in operation on reaching camp.

SAMOAN TATTOOING.

By D. HUNT, Lieutenant Commander, Medical Corps, United States Navy, and L. HUMPHREYS, Lieutenant, Medical Corps, United States Navy.

Many decades past, when Samoan war canoes dotted the South Seas and idols were set up in the "high places," when the belief prevailed that the world was flat and supported by a pillar ascending from the regions below, the Samoan custom of tattooing originated. It has been said that a tattooed man felt not his nakedness when covered by the blue-figured design which at a distance looks not unlike a pair of blue swimming trunks. This simile is used for lack of something better, though it is inaccurate in that it does not completely picture to the reader the shiny blue pigmented skin, the delicate scrollwork, the interlacing figures, and the precise parallelism of the ribbon markings.

In this generation the Samoan men wear "lavalavas," or loin cloths, and the women the same, with the addition of a tuniclike affair that reaches to the hips, or a long, loose gown; so tattooing for purposes of covering nudity is no longer practiced. Through generations of usage it has become so firmly established as a Samoan custom that a young man is not supposed to meet other men on equal terms until he has been tattooed. There was recently admitted to the Samoan hospital a young man who, when he was half tattooed, had refused to let the operator continue on account of the severe pain. It was an unfortunate thing for him, for he has been persecuted, jeered at, and his life made miserable ever since by the young men of his age. He came to the hospital with a feigned disease to escape his persecutors.



INSTRUMENTS USED IN TATTOOING IN SAMOA.



SAMOAN OPERATION OF TATTOOING.

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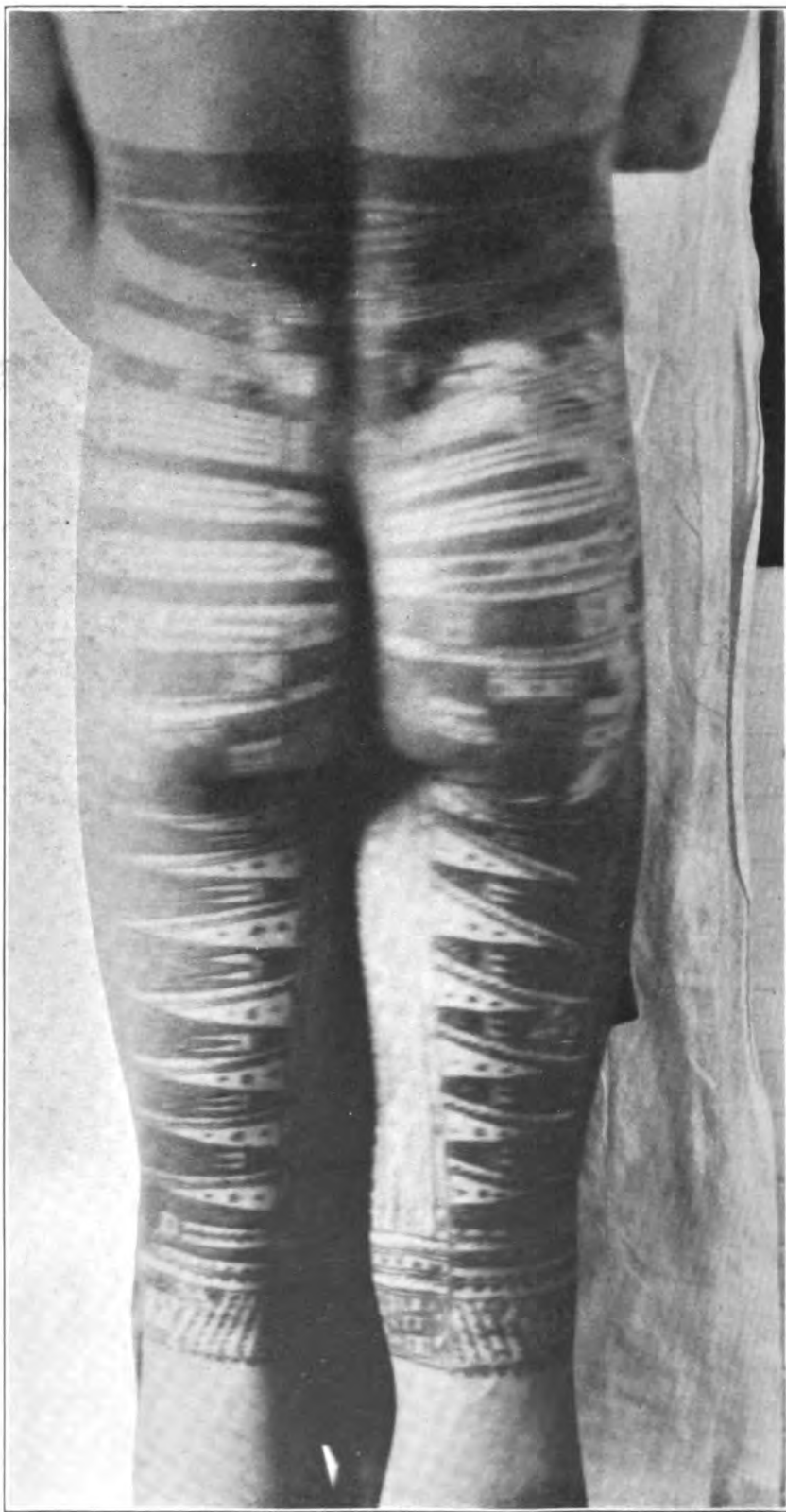


TATTOOING PARTLY COMPLETED. THIRD DAY OF OPERATION.

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346—3 SAMOAN TATTOOING. NOTE TATTOOING OF NAVEL.



SAMOAN TATTOOING.

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The women are usually not tattooed, but some of them have numerous small designs tattooed on the legs and the backs of the hands. Samoan women regard those men who are not tattooed with great disfavor and freely express their contempt for anyone who fails to comply with the time-honored rite or custom.

One of the illustrations shows a series of instruments used in tattooing, quite unusual in type, since they resemble hoes, adzes, fine-tooth combs, and scrapers. They are made of bone, sometimes human, usually animal. The bones are first made flat by grinding and rubbing with sea shells, and then cut so as to resemble a fine-tooth comb, and are fastened to reed handles. The combs vary from one-eighth to 4 inches or more in width. The coconut shell contains burnt candlenut, the pigment usually employed. The small wooden bucket in the center contains "tapa" cloths for wiping the bloody, newly tattooed surfaces. On the right, on the banana leaf covering the can, is a small amount of the pigment in which the combs are dipped. Small sticks, which may be seen lying across the large wooden bowl, for striking the combs complete the equipment.

The operator is highly skilled and his profession is a respected one. In the olden days the fraternity of tattooers was an influential and important body, presided over by two female deities—Tilafainga and Taema—whose patronage was regarded as very important. Recently a Samoan tattooer became blind when still a young man, because of a chronic keratitis which resulted from the pigment frequently lodging in his eyes. Several such cases have been reported. It can be seen from one of the illustrations with what seriousness the operator and spectators regard the operation of tattooing.

The young chief who is to be tattooed usually has several young men of the village tattooed with him and he must provide entertainment for a number of guests besides. He is escorted to the house of the high chief of his village, lies down on the mats that have been spread for the occasion, and friends take their places at each hand and foot to hold him supine. Some years ago a special hut was erected for this occasion and those tattooed were not allowed in the village until the operation had been completed. The operator seats himself to the right flank of the patient (for such he shortly becomes), rests his right foot on the side of the hips, which with the aid of assistants opposite draws the skin of the abdomen tense. The instrument selected is dipped in the pigment and then struck sharply into the skin by a blow from the stick, the instrument being shifted each time. The incisions are made rapidly, an assistant wiping the blood away from the punctured parts. The operation is continued as long as the patient is able to bear the pain, some cases being finished in three or four days, other requiring two or three weeks

for completion. Usually inflammation sets in with fever and the patient is more or less prostrated. The area tattooed extends from below the ribs to below the knees posteriorly, and from the ilia down over the thighs to the knees anteriorly. The skin over the abdomen is spared except the navel, which is the final place to be tattooed, and represents the true test of fortitude.

The final result of the tattooing is either a uniform artistic piece of work as shown in the illustrations, or due to infection of the welts, unsightly scars, sloughing of the skin, or permanent crippling through contractures of scar tissue. Deaths have been reported following tattooing.

SOME NOTES ON THE MANIPULATION OF WAX FOR INLAY PATTERNS.

By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

During a course of instruction at the Chayes Postgraduate Clinic a number of interesting points were observed in the manipulation of inlay wax. Taggart's wax was used exclusively, this being in part because it breaks rather than bends at mouth temperature. In preparation for use, it is never heated in the open flame, but is always softened in water with a temperature between 138° and 140° F. This temperature will not be found uncomfortably warm for the fingers, which are ordinarily used to determine the water temperature. The temperature of the water should never be high enough to cause the wax to blanch or change color; that noted above will soften the wax so that it may be changed in shape by firm pressure. Avoiding the color change will automatically prevent the "state of squashiness" so often seen when the wax has been raised to too high a temperature. Wax in this condition can not logically be expected to fulfill the requirements for definite outlines of the cavity, as when additional pressure is exerted it is not confined by the cavity walls, but is dissipated in all directions as the wax spreads or flows.

The cavity walls should be of the proper inclination, and angles, while definite, should not be sharply defined in the actual angles; rather, more on the order of the junction of the walls and floor in a modern operating room. It is much easier to adapt wax to such a preparation, and the retention of the angles are not thereby sacrificed. Great care should be exercised to finish the inner surfaces of the cavity smoothly. This may be aided, perhaps, in the final steps by the use of folded cuttlefish disks held in the fingers and used with a filing motion. The ideal inlay should have perfectly smooth surfaces; this calls for a smooth wax pattern, which, in its turn, is but a reflection of the care with which the cavity walls have been finished.

It has been found expedient to shape the end of a blunt cone of inlay wax by carving, so that it will fit in the cavity, reaching the

farthest surfaces without binding. The cone may be held in warm water for a short time to soften merely the outer surface which can then be pressed against the opening of the cavity to imprint the margins as an aid in the carving. This is repeated until there is obtained practically a carved pattern on the end of the cone, which will seat easily in the cavity. The end result to be hoped for is, when the cone is heated and finally pressed to place, that those portions of the cavity which are ordinarily the most difficult to reach are the first to be filled and will have behind the wax in them a sufficient mass of material hard enough to insure good outlines.

As stated, water between 138° and 140° F. is used for softening the wax, and in order that the whole body of the wax may not become uniformly softened it is necessary that it be only partially immersed; this may be done by holding it on the end of a sharp instrument or transfixing it on the end of a pin pushed through a cardboard over the top of the container. The inner surface of a pattern should present a smooth glossy surface free from pits or wrinkles and may be obtained by exerting a strong steady pressure from one direction only. The outer surface of the pattern when softened as above remains harder than that which comes in contact with the cavity wall and gives opportunity for confined and continued pressure on the wax in the cavity. The pattern should be held firmly in place until the wax has hardened to prevent the possibility of distortion consequent upon the contraction involved in temperature reduction. The results of many instructive experiments upon the behavior of wax are available; through them all the factor of expansion upon heating seems to be constant.

The pattern is carved to tooth form while in the cavity, occlusal surface last. During carving the knife or carving instrument should always rest upon the surface of the tooth as well as the pattern; this prevents cutting the wax lower than the margins. Doctor Chayes does not believe in allowing overhanging or feather margins upon the patterns; unless these are removed it can not be seen that accurate adaptation has been obtained at all points. If the pattern does not fit the cavity, he desires to know it at this stage, since his inlays are designed to fit without burnishing. My observation has been that it is desirable to carve right to the margins, but, so to speak, not dead flesh with them; in other words, have the edge of the wax end distinctly at the margins with no overlap but a trifle more full than the tooth; this will permit of finishing the casting round and full to restore contour. If the pattern is inclined to be skimpy at the margins—that is, carved without full contour—the finishing will often result in anemic-looking restorations, in marked contrast to those in which the beauty and function of contour have been reproduced.

With a little care the adding of wax to wax is possible with Taggart's preparation, with the expectation of good results except at margins. If extreme care is used in carving to the margins, a portion of the carving instrument always resting on the tooth, it will be seldom that the margins are cut too low. Upon the pattern which extends into the cavity, however, it is sometimes desirable to obtain a more definite outline by the addition of a little wax and then pressing to place the pattern. For this purpose the wax should be added in small amounts as it is near the congealing point and then applying pressure with the finger to the addition until it has cooled. The tendency of wax to draw from wax is thus overcome by the pressure while congealing. Shavings of wax gathered on the spatula and held but a moment in the flame will give wax at about the right temperature for adding and this should be about the same relatively as that of metal prepared for pouring into molds. This same method may be used for additions to contour or for cusp restoration.

We must work upon the assumption that the gold will occupy the same space which the pattern does, therefore a pattern which withdraws with difficulty, if cast as is, should result in an inlay which would go to place with difficulty or perhaps not at all. To reduce this friction of the wax the pattern may be removed and inserted in the cavity a number of times or until it leaves without appreciable effort. Doctor Chayes gives an illustration of the manner in which the pattern should fit by saying that it should be lifted from the cavity with an air pressure of 30 pounds applied in the right direction upon the surface of the wax. This procedure is also said to help minimize the effects of the contraction of metals in the preparation of M. O. D. inlays.

The restoration of contacts should not be attempted in the forming of the patterns, but otherwise the general shape and contour of the tooth should be religiously restored. If an attempt is made to restore contacts on the pattern and the casting goes to place with difficulty or not at all, it then becomes a question whether the contacts are responsible or the fault lies elsewhere. After grinding contacts to seat the inlay, it may be found that it does not fit; or if it eventually fits, then perhaps a little more contact is desirable. To overcome this particularly annoying possibility it is suggested that floss silk or matrix material be passed between contacts before the removal of the pattern and the contacts then to be restored by solder after the inlay has been finished and polished. Investment of the inlay is not necessary to add contacts with solder if it is sufficiently heated and small pieces of solder are used. In the preparation of M. O. D. inlays the above suggestion is of particular value.

Patterns should be invested without delay to prevent the possibility of change of form which is prone to occur, and it is considered

that to leave them uninvested overnight is a serious fault. Likewise after investment they should be burned out without delay; however, once burned out the flask can be kept for a reasonable time without danger of change of form.

The process of investing patterns is one of peculiar delicacy and must be witnessed to be appreciated, therefore a description will not be attempted.

The burning out of the invested pattern is accomplished with expediency and certainty. Taggart's investment is used, and after the mix has set, as noted by the glaze on the investment, the ring is placed over a low flame until all moisture is expelled. This is evidenced by the whitening of the investment. The flame is then turned on and permitted to envelop the ring; in a short time thin smoke will be seen coming from the sprue hole; this is succeeded a little later by a yellow flame from the same source, denoting the ignition of the gases. This is allowed to burn completely, and the ring is not removed from the fire until 30 seconds after the flame has ceased.

A casting can be made when the ring has cooled sufficiently to handle.

POSTOPERATIVE TREATMENT.

By L. MARTIN, Lieutenant, Medical Corps, United States Navy.

The postoperative treatment of patients in the surgical wards of a naval hospital really begins when the patient is admitted to the ward. If the ward is quiet and has the atmosphere of an efficient hospital, if the morale of other patients in the ward is high, and if the nurse and corpsmen are quiet, attentive, and efficient the patient is immediately impressed, quickly falls into the ward routine and is easily managed both before and after operation. But if the ward is disorderly with little or no discipline, if the corpsmen are loud-spoken, rough, and inefficient, and if the ward seems more like a club room than a hospital, the patient is depressed, loses confidence, and is difficult to manage. Preoperative laxness in ward management by the ward medical officer means postoperative fussing and complaining by the patient.

The actual postoperative treatment of surgical patients in the Naval Hospital at Mare Island has been developed into a routine procedure which is followed in every case, the extent to which it is carried depending upon the seriousness of the patient's condition. After any major operation the patient is quickly moved from the operating room to a warm bed in a warm ward. He is covered but not weighted down with blankets and is carefully watched for respira-

atory embarrassment while he is reacting. Proctoclysis is started immediately, using 300 cubic centimeters of a solution containing 5 per cent glucose, 5 per cent sodium bicarbonate, and 2 cubic centimeters of tincture of digitalis. This solution is administered by the slow drop method, and the proctoclysis is then interrupted for three hours to allow plenty of time for the complete absorption of the 300 cubic centimeters of solution. If the patient is in good condition at this time no more proctoclysis is given, but if the patient is suffering from peritonitis, if a gastrojejunostomy, cholecystectomy, or major amputation has been done; or if the patient is in poor condition from any other cause the proctoclysis is continued after the three-hour interruption. It is then made a continuous slow-drop proctoclysis, using 5 per cent glucose, 5 per cent sodium bicarbonate solution until the patient's condition warrants stopping it. The rule should be, if in doubt as to the condition of the patient, continue the proctoclysis. Fowler position is used for all cases of peritonitis and after all upper abdominal operations; flat beds are used for hernia and chronic appendicitis cases.

Gastric lavage is considered one of the most important therapeutic agents in postoperative treatment. I do not believe that it should be done routinely on all patients before they leave the operating table; it is only indicated at this time for patients who have not been prepared for an anesthetic. But after the patient has reacted from the anesthetic the most important duty of the ward surgeon is to watch carefully for indications for gastric lavage, the most important of which are persistent vomiting, distention in the intercostal angle, and the regurgitation of bile. Distention in the intercostal angle must always be looked for as dilatation of the stomach occurs many times without vomiting. The greatest aid to securing a smooth convalescence following gastrojejunostomy is gastric lavage, which may be done as early as eight hours after operation and should be done routinely the morning after operation. If there is time before a stomach or gall bladder operation I believe that the patient should be accustomed to swallowing a tube so that it can be passed without discomfort after operation. I use a Jutte tube and a 100 centimeter Luer syringe for all gastric lavage, and find it very comfortable for the patient and the most efficient method of thoroughly emptying the stomach. The solution used should be very hot water containing 20 grams of sodium bicarbonate to the liter, and to secure the best results the lavage must be very thorough.

An enema consisting of glycerine 6 ounces to a pint of warm water is given as a rule 48 hours after laparotomy. It is a mistake to give an enema too soon after a laparotomy; the results are much better by waiting, and it saves the patient useless disturbance

and discomfort. Morphine is to be considered rather than an enema for early discomfort. I believe that pituitrin will stimulate peristalsis in very obstinate cases, but with our present postoperative routine we very rarely use it. During convalescence patients are given 2 ounces of mineral oil at 9 p. m. and soap-water enemas when indicated.

All patients, except those with infection of the peritoneum, who are given nothing by mouth until the condition is controlled, are given water in small quantities as soon as they are over their anesthetic nausea and are gradually increased to full liquid diet by the time they have had their first enema. Soft diet is started very early, as a rule after 12 hours on liquid diet, and helps to relieve gas pains. Patients who have had gastroenterostomies are given the same diet until soft diet is reached, when they are given six small feedings a day instead of three; they are given no meat until two weeks after operation, when minced chicken and scraped beef are gradually added to their diet. It is a mistake to pamper these patients, as they need very little encouragement to complain for the rest of their lives, so their after treatment should follow the regular ward routine as closely as possible.

Morphine, gr. 1/4 and atropine gr. 1/150 is given by hypodermic injection just before the patient leaves the ward for the operating room and is given after operation as necessary. Each dose of morphine is given dissolved in 2 c. c. of 25 per cent solution of magnesium sulphate. We have found that the magnesium sulphate prolongs the action of the morphine and markedly lessens its nauseating and depressing effects. The quantity of morphine administered to patients in the surgical wards has been decreased by half since this method was instituted.

The drugs to be considered for patients in critical condition are digitalin gr. 1/100 every four hours by hypo, or strychnine sulphate gr. 1/30 by hypo every four hours. For sudden critical change in condition camphorated oil in 2 c. c. doses by hypo and strychnine sulphate gr. 1/30 to 1/15 by hypo are probably most efficient.

The postoperative treatment of hemorrhoidectomies consists in inserting two suppositories each containing gr. 1 of opium and gr. 1/8 of iodoform as soon as the operation is completed and applying 30 per cent bismuth subnitrate ointment on a gauze pad. The patient is then kept in bed with nothing but liquids by mouth for five days. The dressing is changed when necessary. On the fifth day the patient is given 4 ounces of mineral oil by mouth, is allowed out of bed and is given regular diet. No enemas are given. Mineral oil is given every night until the anal region is completely healed.

Sutures are removed on the fifth day after operation except relaxation sutures in rectus incisions which are allowed to remain in place

for 10 days. If the incision shows any signs of infection hot boric acid solution dressings covered by wax paper are applied. This dressing will abort infection in most cases. If infection occurs the wound is irrigated with 2 per cent mercurochrome solution and hot boric-acid solution dressings applied. I can not speak too highly of this type of dressing; there are no contraindications for its use and the results are all that can be desired.

The length of time the patient is kept in bed after operation varies according to the incision employed. If a McBurney incision has been used, the patient is kept in bed for 6 days; if a rectus incision, he is kept in bed for 9 days; and if the operation has been for hernia, he is kept in bed for 16 days after operation.

The importance of ward management and routine treatment can not be overestimated in the postoperative care of patients. When a definite routine has been established, with the nurse and corpsmen knowing the treatment each patient is to receive, there is no uncertainty or confusion; the patient returns from the operating room and the postoperative treatment is immediately instituted. It is well to try out new methods of treatment and we have during the past nine months instituted an entirely new postoperative routine. That the system is efficient is attested to by the fact that the officer of the day is practically never called to see a complaining patient in the surgical ward.

EDITORIAL.

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THE ELECTROCARDIOGRAPH, ITS USES AND LIMITATIONS.

The recent installation of two electrocardiographs, one at the Naval Medical School and the other at the Naval Academy, makes appropriate at this time a brief discussion of the practical value of this instrument. The electrocardiograph records the actual passage, through the conduction system of the heart, of the excitation wave which immediately precedes cardiac contraction. Because of this fact it has made much clearer the mechanism of the heart beat and to a great extent has lifted the haze which formerly enveloped the arrhythmias. What the polygraph left in doubt concerning cardiac irregularity, the electrocardiograph has, for the most part, made it possible to explain. Through the researches which have been carried out by means of this instrument information has been put in our possession which enables the trained observer to diagnose, without any instrument except the stethoscope, cases of arrhythmia, the nature of which was formerly unknown. The existence of sinus arrhythmia, auricular fibrillation, heart block, and the so-called extrasystoles can now be frequently established by means of the ear, finger, and eye. It is true, then, that the facts which have been established by means of the electrocardiograph have made the instrument less necessary to the diagnostician. On the other hand, there are many cases of cardiac irregularity the nature of which can be determined only by means of the electrocardiograph. By no other diagnostic procedure can we detect a heart block of slight degree. It may be extremely difficult or impossible to diagnose by any other method a partial heart block with irregular pulse. Paroxysmal tachycardia frequently can not be differentiated from a simple tachycardia of sinus origin even by the polygraph, whereas the electrocardiograph will make the origin of the rapid impulse perfectly clear. Cases of multiple extrasystoles are occasionally met with which can be identified only by this diagnostic procedure. Even in

the case of simple extrasystole the electrocardiograph only can establish certainly whether the premature beat arises in the auricle, the auricular-ventricular node, or in the ventricle. In a word, the electrocardiograph, as Lewis has so aptly said, is the last court of appeal in the analysis of the many forms of disordered heart action. We may perhaps go further and say that for the diagnosis of the more puzzling cardiac arrhythmias it is a necessity. The ease with which it is manipulated and interpreted and the dependence which we may place upon its results make it incomparably superior to the polygraph. The polygraph is still applicable to bedside use in the home, but where the electrocardiograph is available the polygraph has fallen into disuse.

A further field of usefulness for the electrocardiograph lies in the detection of evidence of myocardial disease. The conduction system of the heart is merely highly specialized muscle tissue. It may, as a rule, be assumed that, if there is any interference with conduction, there is myocardial damage. The electrocardiogram will furnish very clear evidence of this interference with conduction by curves showing heart block or distortions of the curve due to bundle branch block. It is true that not all cases of myocarditis will produce alterations of the electrocardiogram, for the myocardial damage may not happen to involve the conduction system. Positive findings, on the other hand, are very suggestive. Furthermore, extrasystoles, in spite of the more or less prevalent opinion that they are benign, are coming to be regarded with more and more concern. An increase in their frequency following exercise is now considered to be indicative of myocardial damage. Goodall maintains that, if the premature contractions arise in the auricles, the auricular myocardium is diseased. Since the electrocardiograph may be the only means of determining the origin of these premature contractions, this instrument here again demonstrates its value in detecting myocardial disease.

The electrocardiograph is the most certain means we have of detecting dextrocardia. The probable diagnosis may be made by physical examination and confirmed by X ray, but the electrocardiogram is absolutely characteristic.

In addition to these conditions in which the electrocardiograph is able to definitely point out the diagnosis, certain organic changes may often be suggested or the diagnosis of them confirmed by means of this instrument. In about 70 per cent of cases of mitral stenosis we have an electrocardiogram which may be taken as more or less characteristic of this lesion. The evidence offered by the tracing is, as a rule, only confirmatory, but as important additional data may often carry considerable weight. Evidence of hypertrophy of one ventricle as compared with the other, the so-called right or left ven-

tricular preponderance, is frequently furnished by the form of the ventricular complex of the tracing. It is additional evidence to put with physical and Roentgen findings.

Finally, the electrocardiograph aids in a rational digitalis therapy. It shows the presence of partial heart block, the most important contraindication to digitalis. Furthermore, an electrocardiogram from a patient to whom digitalis is being administered will indicate, by certain definite variations in the curves, the point at which the full therapeutic effect has been reached.

In making use of the electrocardiograph it is very necessary that we know its limitations. In the first place it helps little in diagnosing valvular lesions. It may be of some assistance in the diagnosis of mitral stenosis. Furthermore, a tracing showing preponderance of the left ventricle may help to confirm a diagnosis of aortic disease. But, after all, the information obtained in these conditions is of little value compared with that furnished by physical examination and other clinical procedures. Moreover, it should be understood that a negative electrocardiogram does not necessarily mean that the heart is not diseased. It does not even have the negative value in heart disease that the Wassermann has in syphilis. Even where we have abnormal curves such as were described as existing in myocarditis, evidence is usually suggestive or confirmatory rather than positive. Conservatism is necessary in attaching significance to these abnormal tracings. Electrocardiography is still in its infancy. The clinical significance of many of the variations in the electrocardiogram is still unknown. Further investigative work remains to be done before the electrocardiograph can assume its full importance in the field of clinical medicine.

From our discussion here it should not be difficult to understand the part which the electrocardiograph should play in the naval service. Obviously, its chief function should be the diagnosis of the obscure arrhythmias. It should also take its proper place in the diagnosis of myocarditis. The question frequently arises: Is this arrhythmia or this tachycardia or bradycardia a serious and permanent condition which should require the discharge or retirement of this individual? An electrocardiogram will often definitely decide this point. Here is a patient manifesting cardiac symptoms but with no definitely demonstrable cardiac lesion. Is he suffering with myocarditis and therefore a candidate for medical survey? An electrocardiogram may be the deciding factor in answering this question. Shall digitalis be administered to this cardiac patient? An electrocardiogram may be of great assistance in determining this point. Such important questions as these frequently arise in the naval service, particularly at the Naval Academy in connection with the midshipmen and in Washington where cardiac patients are

often sent for final study and disposition. In these cases, the electrocardiograph may be of great value in pointing out the diagnosis, and, what is fully as important, in furnishing the correct prognosis.—L. J. R.

EXERCISE FOR THE PERIDONTAL MEMBRANE.

It is a well-known fact that disuse tends to produce atrophy. May this not apply to the structure known as the peridental membrane in common with the other tissues and organs of the body? As has been called to our attention on many occasions, the diet of civilization consists of food which has been prepared in such a manner as to offer the least resistance to the efforts of mastication. Meat, for instance, which is sufficiently tough to require vigorous mastication is not looked upon with favor by the culinary expert or the epicure, and the masses follow suit. The peridental membrane which surrounds the tooth is of mesoblastic origin and therefore largely dependent upon the lymphatics for the excretion of waste products. It is a highly specialized tissue with a predomination of elastic fibers running in directions which will best support the tooth in the alveolus during the stresses of mastication. With the disuse of these fibers and a consequent lessening of the lymphatic circulation we encounter a lowering of tissue tone, if not of atrophy, which presents a lowered resistance to the effects of irritation of the gingiva, trauma or bacterial invasion.

A discussion of the prevalence of dental caries and peridental diseases usually brings forth the statement that present-day diet seems to be a factor in the etiology. We are told to chew coarse foods, but we must depend upon our ingenuity to select those which will best serve our purpose. The suggestion is offered here that whole wheat grain is worthy of consideration as a means of furnishing exercise for the peridental membrane. Wheat such as has been cleaned by the miller preparatory to milling is readily obtained. It may, however, be of varying degrees of hardness, depending upon the season of the year, the conditions under which it has been stored, and the character of the grain itself. The condition of the masticatory apparatus—that is, its power to do work—depends upon the strength of the muscles of mastication and the condition of the teeth and their investing membranes. Thus the amount of force which might be exerted by certain individuals would be beyond the ability of others. For this reason it is necessary to prepare the wheat to suit individual requirements, by soaking it in water a short period of time before it is eaten. A convenient method is as follows: Take an ordinary drinking glass which holds 8 ounces, fill this three-fourths with wheat, add water to cover and let stand from a few minutes to half an hour as may be found necessary. The wheat

having been soaked, the excess water is drained off and it may then be masticated a teaspoonful at a time, while reading or otherwise engaged. When chewed it should offer distinct resistance to mastication without bringing undue strain upon the teeth.

The mastication and ingestion of this food would seem to offer several features of merit. First, we have the exercise and stimulation of the peridental membrane, which can not be gainsaid after one experience. Chewing grains of wheat is real work, and the tone and stimulation afforded to healthy tissues should help preserve immunity to disease, and might be a possible factor in assisting to return to normal areas where the peridental membrane has been but slightly affected. Second, the teeth are cleansed as nature intended, by the friction of foodstuffs passing over the inclined planes and through the embrasures, secondarily stimulating the gums and mucous membrane in the vicinity. The rough outer coating of the grain is responsible for the friction. The starch granules in uncooked grain are enveloped in cellulose coverings, which while facilitating their removal from interdental spaces also serves to prevent their becoming immediately available as carbohydrate food for the lactic-acid-excreting bacteria. Third, certain inorganic salts which are contained in the germinal portion of the wheat as well as some of those contained in the outer covering are made available for assimilation. Fourth, there is the possibility of the ingestion of vitamins, which, as is well known are usually destroyed by cooking. Fifth, the bearing on general elimination is one which should be considered; the ingestion of wheat grains in this manner furnishes some indigestible cellulose which stimulates intestinal peristalsis. The writer has knowledge of a case of constipation which was permanently relieved by this simple expedient.

From a dental standpoint relief from local irritation of the gingiva and traumatic occlusion, if such exist, should be undertaken before vigorous exercising of the peridental membrane. The presence of these conditions can usually only be determined by dental inspection, but their elimination is of such importance in prevention as well as in treatment that they can not afford to be overlooked. Bacterial invasion is secondary in a field in which resistance has been lowered.

The quantity of wheat to be eaten and the intervals of time between is best left to the individual, twice weekly might be suggested as a schedule upon which to start.. (H. E. H.)

THE PREVENTION OF BURNS.

In compiling accident charts, safety engineers find that burns usually hold a leading position among the causes of lost-time acci-

dents. Seldom does this hazard cause a fatality, but especially in those plants where there is much handling of hot material, time lost as the result of burns may assume vast proportions by the end of the year. A symposium of the experiences of members of the National Safety Council, dealing principally with burns caused by hot metal, recently appeared in the National Safety News. The seriousness of this hazard is evidenced by the measures taken in combating it by safety engineers throughout the country. As in the case in eradicating most accident hazards, education leads all efforts in getting results. There is much that has been done in a mechanical way to guard against burns, but the consensus of opinion is that it is not possible to install a safeguard that will entirely remedy the difficulty. The solution of the problem, therefore, lies in continual training of the workmen in personal carefulness. It has been noticed, however, that, as in the case of combating any other hazard, best results are obtained after everything possible has been done in a mechanical way.

The use of proper clothing by foundry men and other workers in the steel and iron industry has done much to reduce the hazard from burns. Proper leggings, safe shoes, asbestos hats, face masks, coats, and gloves, when used always bring about a reduction in the number of burns.

Among the various mechanical devices in use we find mention of one which is of interest to naval medical officers serving navy yards where ship construction is in progress. The McClintic-Marshall Construction Co., Pittsburgh, has overcome a hazard which has long been peculiar to the construction industry, namely, burns from falling heated rivets. Although the men in that plant had acquired and were proud of a skill in throwing and catching these red-hot pieces of metal, it was found that the practice was dangerous and should be eliminated. A 2-inch pipe running from the heater down to the riveter below was installed. The man on the heater end drops the hot rivet into this pipe and it falls into a metal bucket at the other end. The men, while at first bemoaning this passing of an old practice, have accepted the device and are thoroughly convinced of its efficiency over the old method.

In all the endeavor of the members of the National Safety Council to diminish the number of accidents, no case has been reported in which efforts aimed at a reduction of burns have not brought results.

(W. M. K.)

ON LEAD POISONING.

Lead poisoning often appears in unexpected places. Not long ago the naval personnel at the Hog Island Radio Compass Station with their families, which included several children, rather suddenly experienced severe colic which persisted with varying intensity and re-

sisted all home remedies. A medical officer was sent by airplane from the naval operating base at Hampton Roads, Va., to investigate the affair. On his arrival he found that every person at this isolated station had been affected, that two men and a child were then suffering from severe colicky pains in the abdomen. The entire population was anemic looking, and one child presented a typical lead line on the gum margin. A sanitary survey of the station tended to incriminate the water supply. The station depended upon rain water collected from the metal roof of the main building for its supply of drinking water. This water was stored in a cistern. Examination of the roof showed several areas coated with red lead a part of which had been removed by the rain and carried into the cistern. Of course cleaning the cistern and properly painting the roof remedied the condition. (W. M. K.)

THE VALUE OF THE X RAY IN SKIN DISEASES.

In connection with Lieutenant E. L. Whitehead's paper on "The scope of X-ray therapy in naval practice," which appears elsewhere in this issue of the BULLETIN, it may be said that a great deal has appeared recently in medical literature regarding the treatment of skin diseases by this agent. As the author has stated in the paper, in order to obtain the benefit of X ray in diseases of the skin it is necessary that the operator possess modern apparatus, which should be safe for the patient as well as the operator, and with which an accurate and exact dose can be given. An accurate knowledge of the apparatus on the part of the operator is necessary as well as an understanding of the biological action of the X ray. The X ray is a powerful factor for good and also for harm, therefore the medical officer who undertakes to treat dermatological conditions by means of this agent must not only know his apparatus, but have a clear conception of the principles of treatment, the pathological processes present, the clinical characteristics, and the causes of skin diseases.

The X ray is perhaps the most potent remedy in the treatment of some dermatological diseases in our possession. Dr. M. V. Leof, of Philadelphia, in discussing "The value of X-ray therapy in skin diseases" in the New York Medical Journal for October 4, 1922, gives the following summary of the reasons of its effectiveness:

1. The X ray possesses chemical action. It has the power to alter elementary substances as well as simple organic and inorganic compounds, the changes being due to oxidation.
2. Biochemical action. The X ray can modify the production and action of enzymes and ferments.
3. The X ray has bactericidal power.

4. Minute amounts of radiation stimulate, while large amounts inhibits and destroy tissue.

5. Cells that are undifferentiated, immature, biologically or physiologically, are most readily influenced.

Certain skin diseases which are rather resistant to the ordinary methods of treatment respond readily to the X rays, and it is well to keep this fact in mind when X-ray therapy is available.

Many dermatologists consider the X ray a specific in the treatment of acne vulgaris. Three to sixteen fractional doses are said to effect a permanent cure.

The X ray is of great value in the treatment of furunculosis and a few exposures often prevent the development of new boils.

Ringworm of the scalp is cured by X-ray depilation of the entire scalp which, with the Kwinbock-Adamson method, may be accomplished in about half an hour by a skilled operator.

The X ray accomplishes the same results in favus as in ringworm of the scalp. Tinea barbæ is likewise cured by the same means although the technique is somewhat different. The lesions of psoriasis respond readily to irradiation, although recurrences are common. In regional prurites, X-ray therapy is of distinct value. Warts respond readily to the rays. Multiple warts can be removed without leaving scars and without pain. True keloid formation in scars respond favorably to the X ray.

All roentgenologists agree that the basal cell epithelioma is comparatively easily cured by the X ray. Modern technique has been so perfected that from 1 to 10 exposures cure nearly 90 per cent of the cases. In the case of the prickle cell epithelioma, the results are not so favorable, because metastases are very likely to take place.

(W. M. K.)

GONORRHEAL ENDOCARDITIS.

Dr. W. S. Thayer, in the Bulletin of the Johns Hopkins Hospital, for October, 1922, discusses the 22 cases of gonorrheal endocarditis which have been observed in the Johns Hopkins Hospital since 1899. The comparative frequency of the gonococcal origin of endocarditis is shown by the fact that out of 176 cases of acute endocarditis in which the bacteriological nature of the process was determined at the Johns Hopkins Hospital by blood culture or at autopsy 20, or 11.3 per cent, were due to the gonococcus.

The relation of the onset of the symptoms to the stage of the initial infection could be determined in only a few cases, in which the interval varied from a few days to a month. In several instances all traces of urethritis had disappeared.

The symptoms were uniformly those of a grave septicemia. The onset was in some cases gradual with headache and general malaise, in others, more sudden and beginning with a severe chill. Examination of the blood showed a rapidly progressive anemia and well-marked leucocytosis. Embolism occurred in two-thirds of the cases. Cutaneous hemorrhages in the form of petechiæ on the limbs, trunk, or mucous membranes were frequent. Nephritis of varying grades was present in most of the cases. The duration of the endocarditis ranged from three weeks to eight months and all of the cases proved fatal. (W. M. K.)

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CLINICAL NOTES.

A FATAL CASE OF NEPHRITIS WITH SPECIAL REFERENCE TO THE NITROGEN RETENTION.

By G. A. ALDEN and C. F. BEHRENS, Lieutenants, Medical Corps, United States Navy.

The patient, J. J. C., aged 24, was admitted to the United States naval hospital, Norfolk, Va., on July 20, 1922, with the diagnosis of acute nephritis. He gave the following history: Always felt well until July 18, 1922, on which date, following violent exercise and a cold shower, he developed persistent headache and backache. Two days later he had several attacks of convulsions and was then transferred to the hospital.

Past medical history: Mumps and measles in childhood.

Family history: Negative.

Physical examination. Sallow complexion; slight edema of the legs; systolic mitral murmur transmitted to the axilla and systolic aortic murmur transmitted to the vessels of the neck; moderate cardiac enlargement to both right and left; blood pressure 152-60.

Laboratory findings: Urine showed low, fixed specific gravity; heavy cloud of albumen with numerous dark granular casts; output 2,500 cubic centimeters for 24 hours. Phenolsulphonephthalein elimination for the two hours was zero. Blood chemistry determinations¹ showed (in milligrams per 100 cubic centimeters): Nonprotein nitrogen, 149; urea nitrogen, 101; uric acid, 23.2; creatinine, 12.1; sugar, 176. The plasma CO₂ was 29 volume per cent. Wassermann was negative.

Further progress of the case: Upon admission the patient was put to bed and given hot packs. Alkali was given by mouth and a low-protein diet ordered. For a period of four days he improved, and then, on July 25, became semicomatose and had two attacks of convulsions. The blood pressure rose to 170-60. Withdrawal of 500 cubic centimeters of blood and the use of hot packs relieved him. Three days later his condition again became desperate, but once more he responded to treatment. More permanent improvement now ensued. Thus on August 18 he was able to sit up, and by August 24 was up and about. However, although the patient

¹The normal values for adults are: Urea nitrogen, 10-15; uric acid, 2-3; creatinine, 1-2; sugar, 90-120.

felt well, his blood chemistry figures remained high, the nonprotein nitrogen averaging over 150 and the creatinine not falling below 4.6. The urine picture remained about the same, except that the casts diminished in number and became of the light granular type. During the first three weeks of September he continued to feel very well, but by September 21 mental dullness and inability to retain food developed. From then on he became gradually worse. On October 6 the urine output reached 6,400 cubic centimeters. Finally, on October 7, he died in uremia.

The following table shows his clinical condition as compared to the blood chemistry findings:

Date.	Nonprotein nitrogen.	Urea nitrogen.	Uric acid.	Creatinine.	Condition of patient.
July 21.....	149	101	23.2	12.1	Uremia, blood pressure 152-60.
July 27.....	115	.....	.....	.....	Uremia, blood pressure 170-60.
July 29.....	145	.....	.....	.....	Improving.
August 3.....	148	102	10.8	5.3	Improving, blood pressure 124-84.
August 10....	149	115	6.4	6.0	Improving.
August 17....	171	125	7.1	7.0	Up in chair.
August 24....	177	123	5.9	4.6	Up and about.
September 14.	177	124	7.9	12.7	Still feeling well.
September 21.	163	123	8.8	11.6	Mind sluggish; unable to retain food.
September 28.	180	135	8.3	13.1	Growing worse.
October 7.....	.....	.....	.....	.....	Death in uremia.

Upon looking through the above table, it appears that the variations in the creatinine ran most nearly parallel to the variations in the condition of the patient. Thus, although it was always high from an absolute standpoint, it became relatively low when the patient was feeling well, and then a few weeks after it reached a relatively high level the patient became worse and died. The reason for this state of affairs probably lies in the nature of the creatinine metabolism. Creatinine is endogenous in origin to a greater extent than urea or uric acid, and in addition its formation seems to be a function of the life of the muscle tissue, and not to depend on the muscle tissue's function of contraction. It is thus formed in very constant quantities and so, since its disposal is largely a function of the kidneys, the concentration of this substance in the blood naturally depends almost completely upon the ability of the kidneys to excrete it. Therefore, in severe cases of nephritis its estimation is of particular value, especially since a high blood creatinine value is of such grave prognostic import.

The uric acid, it will be noted, took an abrupt drop and then remained fairly constant to the end. This reduction probably repre-

sents not only an improvement in the renal condition, but also the lopping off of an exogenous fraction due to the restricted diet.

The urea, which under usual conditions is chiefly exogenous in origin, and which accordingly is greatly modified by diet, showed no response in this case. It was 101 when the patient was in uremia, and then, when he improved as a result of dietary management and other treatment, it nevertheless increased. One would expect the reverse, of course. To explain this, one could say that the kidney threshold simply remained intractable and mounted up. Other factors, however, may have aided. Increased protein catabolism consequent on a previous lag, or else a lag in the urea excretion, may have aided, since alternate accumulation and sweeping out of nitrogen has been frequently observed. Unfortunately, we can not say definitely whether this happened or not, as this problem did not occur to us at the time we had this patient under observation, and as a result, the necessary systematic study of the nitrogen equilibrium was not made.

This case also provides a good illustration of the fact that the retention of urea, uric acid, etc., does not itself cause uremia. Some other factor operates to produce it and the degree and nature of the nitrogen retention indicates the likelihood of this factor becoming active. Thus upon admission in uremic condition, the patient had a nonprotein nitrogen of 149, and shortly after, when he was still uremic, it fell to 115 for a brief period. Later when he was feeling well, it rose to 177 without causing symptoms. Such a degree of retention, combined with the high value for creatinine, indicated, of course, the fatal termination which shortly followed.

A very striking feature is the freedom from symptoms and the apparent health this man enjoyed while tottering on the verge of uremia. Prior to the actual onset of uremia he felt ill for but two days, although in all probability his renal function was seriously impaired long before. Then after recovering from the uremic attacks, he became able to be up and about and felt well for a period of about a month, when at the same time his blood-chemistry findings showed him to be bordering on uremia.

The value of blood-chemistry determinations, in giving an accurate picture of the functional adequacy of the kidneys and indicating the prognosis in a case of nephritis is thus clear. As they also furnish an index to dietary management and treatment and can be easily carried out, it follows that they are of the greatest practical importance in dealing with nephritis.

SOME OBSERVATIONS ON A PAPPATACILIKE FEVER OCCURRING IN CUBA.

By E. A. STEPHENS, Lieutenant, Medical Corps, United States Navy.

The appearance of a number of febrile cases of indefinite origin among the members of a ship's landing force encamped at Guantanamo Bay, Cuba, directed attention towards the insect life of the vicinity. It is always a safe rule to immediately think of insects in a circumstance of this kind, especially in the Tropics.

The disease, 10 cases of which were observed, was influenzoid in character, of sudden onset and short duration. The incubation period was four to seven days. The illness began with a chill or chilliness, severe frontal headache, pain in the neck, backache, and muscular soreness throughout the entire body. These symptoms were accompanied by nervousness, anorexia, insomnia, and moderate prostration. There was an initial rise in temperature to 102°–103.5° F. with a pulse of 100–120.

The physical examination did not reveal anything remarkable. The negative findings were usually the most important. Blood smears were negative. The lungs were clear and heart tones unimpaired. Aside from a mild congestion of the throat in most cases and slight glandular enlargement in a few, the physical findings were not otherwise distinctive. The white blood count was 6,500 to 8,000—never above. The temperature reached normal on the evening of the third day or the morning of the fourth, and the patient was free of all symptoms at this stage. Convalescence was rapid and without complications. Such a picture naturally brings to mind several conditions, foremost of which is malaria. Influenza, dengue fever, and especially phlebotomus or pappataci fever are also to be considered. Of course other acute infectious diseases are not to be lost sight of since the symptomatology described is not unlike the early manifestations of many diseases.

The close resemblance to pappataci fever suggested that the midges which were so plentiful around the camp might be a factor in the transmission of diseases.

Midges are insects of the order Diptera, the family Chironomidæ and have a universal distribution, being exceedingly troublesome around large bodies of water. The generic name given to this group is Ceratopogon. There are several hundred known species of this genus, the most important of Cuba being *Culicoides pulicaris*, *Teresthes torrens*, *Oecacta furens* and *ceratolophus*. The one most often found in the vicinity of the camp was *Oecacta furens*. Its principal characteristics are: A small nonhairy body; a short hairy proboscis; palpi the same length as proboscis; antennæ fourteen jointed, the terminal sections being hairy. The wings have smooth

margins, longitudinal veins are not forked, and there are no transverse veins; no scales on wings. The distal half of the wings has a granular appearance. The total length of the wing is slightly less than that of the body. The legs are of equal length and carry minute spinous projections on the proximal section. The total length of the insect is about one-twelfth of an inch. Only the females of this genus are bloodsuckers. This they do most vigorously. They are extremely active at daybreak and sunset and usually when their victim is not in motion. They do not attack during the night to any extent. It is extremely difficult to combat their activities, because they can pass through the ordinary mosquito netting and are exceedingly wary and cautious.

It has been held that members of this family (Chironomidæ) do not cause disease. However, that insects were playing a part in our cases seemed plausible. A majority of persons in camp were bitten. All of these were not ill, but of those who were ill, all had abundant evidence that this little midge had been very active. They are extremely irritating and furious in their attack. The dermatitis produced by their bite is very annoying, and the itching that accompanies it is not unlike that of scabies. From two to four weeks are required before all skin signs are eliminated.

As noted before the symptomatology was not unlike that of papataci or three-day fever. The transmitting agent in this disease is a moth midge (*Phlebotomus papatasi*). It is generally believed that when *Phlebotomus* is absent this fever is not found. The sand fly (*Phlebotomus*) could not be found in the vicinity of the camp. Neither was the mosquito considered to be a factor, since the camp was almost entirely free of mosquitoes. The onset suggested dengue fever but the further course of the disease had nothing in common with it. Malaria was eliminated by the blood picture and the absence of mosquitoes. Influenza did not seem to be a probability in view of the fair weather, absence of any other cases in the surrounding country, and the short duration of the disease without respiratory symptoms.

It seems unnecessary to further discuss in detail the question of differential diagnosis. The symptom complex was that of an acute infection presenting a picture that had much in common with other diseases but without the well-defined etiological factors present to definitely establish their diagnosis.

It is fully appreciated that there is no definite basis for believing that the Cuban midge is a factor in disease transmission. The paucity of cases precludes the advisability of drawing any definite conclusions in this connection. One must always avoid a natural tendency to make facts fit conclusions. It is regrettable that facili-

ties were not available for carrying on experimental studies along the lines indicated.

Nevertheless it seems worth while to regard this insect with at least some degree of suspicion. The midges (Chironomidae) are closely allied to the moth midges or sand flies (family Psychodidae) in habits, distribution, and physical characteristics. It is quite permissible to speculate upon the possibility that the filterable virus carried by *Phlebotomus* (sand fly) and which is known to be the cause of true pappataci fever has been in some manner transmitted to members of the family Chironomidae. No other cause could be found to explain the appearance of these cases. This fact alone does not incriminate the midge. It does indicate, however, that at least ordinary precautions should be observed and their presence not wholly ignored. The dermatitis alone with resulting complications would be a menace to any large military force.

**REPORT OF A CASE WITH SYMPTOMS OF MOTOR APHASIA FOLLOWING
NEOARSPHENAMINE INJECTION.**

By A. J. DESAUTELS, Lieutenant (Junior Grade), Medical Corps, United States Navy.

F. S., corporal, United States Marine Corps, was admitted as a patient at the yard dispensary, Olongapo, P. I., August 24, 1922, with an explanation from the sergeant who accompanied him that the patient was delirious. The sergeant stated that the first evidence of mental derangement occurred the previous night while the patient was on sentry duty when he called passers-by in out of the rain, in spite of the fact that it was not raining, detaining them forcefully in the guardhouse until they were allowed to go by the sergeant of the guard. It was thought by his mates that he was under the influence of intoxicating liquor, though they knew him to be an abstainer, and he had slept that night in the guardhouse. He took the sentry duty at the same post the following morning, when his ridiculous remarks were noticed by the sergeant of the guard, who immediately brought him to the yard dispensary.

The previous history of the patient, coming under our knowledge, and apparently bearing upon the present condition, is as follows: Patient contracted a mixed chancroid and syphilis infection in Tientsin, China, May 19, 1922. The lesions, multiple and apparently all chancroid, responded fairly well to treatment, and were completely healed about June 15. On June 10, 1922, Wassermann reaction was reported negative. Typical signs and symptoms of the secondary stage of syphilis appeared the following day, June 11, and 0.3 gram of neoarsphenamine was administered on that date. A slight reaction, headache and vertigo, occurred from this small

dose. Wassermann reaction was reported 4-plus positive on June 17. The second injection of neoarsphenamine was given on June 18, dose 0.45 gram, again with a mild reaction similar to the first. On June 27, 0.6 gram was injected, with no reaction. At this time all the symptoms and signs of "secondaries" had disappeared. No reaction resulted from the 0.75 gram administered July 6. Beginning July 13 and continuing to August 15, at weekly intervals, the maximum dose of 0.9 gram was given, and there was not, after any of these injections, the slightest reaction.

On August 22, 0.9 gram was injected and the patient was detained, as were the other three who received treatment, for two hours for careful observation, as the drug was of a new lot recently received, more slowly soluble, and the solution a darker color than that used previously. At the end of two hours, as there was no sign of reaction, the men were allowed to go. It was on the following night, August 23, that the patient became mentally confused on post, and he was admitted the following morning.

Examination of the patient directly after his admission brought out signs of a confused mind, characterized by marked evidences of aphasia. His answers to simple questions consisted of a series of misused nouns and verbs, combined with nonsensical, meaningless polysyllables, with only an occasional lapse into three or four short words of sense. The noun "representative" and the verb "represent" were used almost continually, regardless of meaning. He apparently understood the questions asked him, as shown by his attempt at an immediate answer, and also by the fact that his manner denoted that he had answered satisfactorily. He was asked to sing, and sang "There's a Long Long Trail a-Winding," with little difficulty, requiring only an occasional word of assistance to his confused memory; this test proved his ability to understand questions, and the result was in accordance with the text-book description of motor aphasia. In his song he did not use any of the meaningless words and syllables which characterized his speech.

His speech seemed to indicate true symptoms of aphemia, or the loss of motor-word memories.

He was then given pen and paper, and was asked to write from dictation; first, his name, which he wrote correctly though with difficulty; then "I am in the naval dispensary, Olongapo" was dictated clearly and each word spelled for him in a loud voice as he wrote it. The result was ridiculous, as was his attempt to write from dictation, again each word being spelled loudly for him as he wrote it. He examined the writing carefully, and appeared satisfied with it. He copied correctly, however, a written sentence placed before his eyes.

His writing showed true evidence of agraphia, or loss of graphic motor-word memories.

The symptoms of aphasia in this case, consisting of both aphemia and agraphia, are purely motor, there being no evidence of sensory disturbance, that is no "word deafness" nor "word blindness."

Physical examination revealed no sign of paralysis, no abnormal reflexes, nor any other neurological disturbance. The temperature on admission was 100° F.; pulse 84. Heart and lungs were negative.

The patient complained of general headache, not localizing it to any particular part.

Treatment consisted in putting the patient to bed, and opening freely the channels of elimination.

The following morning, August 25, the patient appeared practically normal, talking well, writing well from dictation, and being only slightly confused mentally. He was asked if he remembered his condition of the previous day, and answered that he did to a certain extent; he realized that he had had difficulty in talking, but could not recall what it was; he remembered clearly the singing; he also recalled writing, but could not believe he had written so ridiculously, after examining the specimens shown him.

His mind continued to clear throughout the day, and he was normal at night. He was kept under observation until August 28, when he was discharged to duty, mentally clear and physically well.

He denies having had any intoxicating liquor at any time previous to the onset of the symptoms described, and investigation bears out the truth of his statement. No reason can be found for believing the patient was malingering, and the findings do not justify such a belief.

The family history in this case is negative.

With no better explanation available, it is thought probable that the temporary and rare symptoms described were the result of the neoarsphenamine injected the day previous to their onset.

NOTES AND COMMENTS.

In connection with a paper on mosquito control in St. Thomas by Lieutenants Peterson and Walker, Medical Corps, United States Navy, which appears elsewhere in this issue of the Bulletin, the following memorandum from the Bureau of Fisheries on the guppy fish, *Lebistes reticulatus* (Gunther), is of interest:

The "guppy fish," also known as "millions" and "rainbow fish," is a top minnow of the family Poeciliidae, first described by Gunther from Trinidad, Venezuela, under the name *Girardinus guppii* (Gunther's Catalogue of Fishes, 1866, Vol. VI, p. 353), and named in honor of his friend, Mr. Guppy. The name of this species has been changed several times, but now stands as *Lebistes reticulatus*; it will be found advertised under the latter name as well as under the name "guppy" in various numbers of Aquatic Life.

These little fish when grown may be kept in aquaria with some of the larger species. It has been found that they are safe with the swordtail or sabertail (*Xiphophorus helleri*); the guppy, being the more active, is able to effect his escape when attacked, provided the aquarium is roomy and well stocked with plants. With the species of *Gambusia* the guppies do not agree so well, as the *Gambusia* are equally active, very predaceous, and make savage attacks on the smaller guppies, mutilating their tails by frequent nippings, thus disfiguring them and making them liable to fungus disease.

Experience has shown that in water varying from 75° to 85° F. young guppies grow rapidly and will reproduce at the age of 2½ to 3 months. One of a brood of 17, born in February and reared in an aquarium 10 inches long and 6 inches wide gave birth to young at the age of 4½ months. In this case the water was subject to rather uneven temperature which varied from 70° to 80°, more or less.

The temperature of water in which fish are kept should never be suddenly changed, especially from a higher to a lower degree. In changing the water in an aquarium the fresh may be brought up to the temperature of the old water by the addition of a little hot water, or the fresh water may be allowed to remain for several hours in the same room before making the change.

The summer-reared guppies grow more rapidly than those reared in winter, as it is difficult in the average home to maintain an even

temperature in aquaria at this season. If possible they should be kept in the open air in summer, in glass aquaria, or in wooden tubs, where they will thrive and grow rapidly, as they are able to obtain much live food in the way of mosquito larvæ and small insects.

In rearing young guppies, it has been found best to remove the female from other adult fish before she gives birth and place her in an aquarium well stocked with plants. After the young are born the mother may be replaced in the tank with the other fish and the young left to grow unmolested until they are large enough to be safe with adult fish, which would be in about a week or two, if they make a good growth. If one has a large tank, say 18 or 20 inches long, a wire screen may be placed across one end to form a place of refuge for the new-born young. With this arrangement it would be unnecessary to remove the mother from the tank before she gives birth. The mesh of the screen should be between one-eighth and one-fifth of an inch square, so that the young may pass through readily. If live food is not available they may be given scraped beef, which may be fed them by placing it in a fine-meshed wire net or a piece of fine bobbinet and shaken into the water. Powdered graham crackers and dog biscuit may also be fed. It is well to feed the young a little of such food about twice a day.

The aquarium should be well stocked with plants and set in a well-lighted position, a south window being most desirable; the sun should not be allowed to strike the aquarium for any great length of time, especially in summer, but some sunlight promotes the growth of vegetation, warms the water, and keeps the guppies active and healthy. It is not necessary to change the water in the aquarium unless there should be an overgrowth of minute vegetation, which is indicated by the water turning green; a certain amount of this green water is very beneficial, especially to the young fish, but when it becomes so thick that one can not see through the aquarium, half or more may be drawn off and fresh water added. Arranged in this way, sufficient oxygen is generated by the action of the sun and light on the plants to supply the requirements of the fishes, and the water need be changed but rarely unless it is overstocked with fishes, or unless it becomes foul through the decay of surplus food, or too green through the growth of minute vegetation, as before mentioned. The amount of greenness may be regulated by the amount of light allowed the aquarium. The bottom of the aquarium may be kept free from decaying food and vegetation by the use of a siphon, or by a glass dip tube. Tadpoles and snails do not molest live fish and are useful in keeping the aquarium clean by devouring surplus food. The Danish red snail is particularly recommended for this purpose, being ornamental and not as destructive to the plants of the aquarium

as some of the other species, the four-horned, or Singapore snail, for instance. The Singapore snail is said to destroy the obnoxious Hydra which sometimes gain access to aquaria and kill the young fish, but these snails are so voracious that the vegetation is apt to suffer too severely if they are allowed to remain among the permanent inhabitants. Hydra may also be destroyed by removing the fishes and gradually bringing the temperature of the water to 102° and allowing it to cool. This will not harm the plants or other animals, with the exception of the fishes, but it will kill the Hydra.

Writing in Aquatic Life for May, 1916, on *Lebistes reticulatus*, Mr. C. J. Heede says:

"This interesting live-bearing fish, formerly called *Girardinus guppyi* and *Poecilia reticulata*, was first introduced to fish fanciers in the year 1908 by the German firm of C. Siggelkow. It is a native of Surinam, Venezuela, Trinidad, and Barbadoes. They are so abundant in the latter place that they are called the "million fish." The English Government has distributed them through their colonies, as they have proven to be very destructive to the larvæ of malaria-carrying mosquitoes.

"This species thrives and breeds freely in the aquarium if a temperature of about 65° F. is maintained. Every four to six weeks young parent fish will bear 10 to 20 fry; older specimens will bring forth as many as 50.

"The coloration of the males, which are but about an inch long, is gorgeous. The body, tail, and some of the other fins are marked with all hues of the rainbow. Hardly two males are precisely alike, and the color may vary with the temperment, especially in breeding time, when the females are being courted. The females are larger and more stoutly built than the males, and are silvery yellow, without distinctive marking. This species is exceptionally pretty, and always alert and moving about—never quiet and in hiding. The males constantly occupy themselves courting the females.

"The young, newly born, need not be removed from the breeding tank if the parents are well fed and the aquarium well planted with *Myriophyllum*, *Sagittaria*, *Heteranthera*, *Elodera*, and *Fontinalis*, and the surface well filled with floating plants, such as *Riccia*, small species of *Utricularia*, and so forth. Among these floating plants the youngsters will find security during their first few hours; one day old they are strong and active enough to guard against possible cannibalism on the part of larger specimens of the same species; other fishes will not have been placed in the same tank.

"As with all live-bearing fishes, the young are not dependent upon Infusoria during their early days. Their food requirements are easily met with raw, scraped beef and crushed earthworms, while even the artificial foods are welcomed.

"In breeding *Lebistes* it is well to provide two or more males for each female. The males acquire their coloration when 8 to 10 weeks old, and are then ready for breeding with females of the same age or older.

"This fish is to a great extent a vegetarian, and as such contributes much to the success of its aquarium. It keeps the water clear and the plants free of vegetable parasites, thus promoting their growth, which means increased quantities of oxygen—a benefit to themselves."

The Department of Commerce, Bureau of Fisheries, Washington, D. C., has prepared the following bibliography of the fishes destructive of mosquito larvæ:

Kuntz, Albert. Notes on the habits, morphology of the reproductive organs, and embryology of the viviparous fish.

Gambusia affinis. Bureau of Fisheries Document 806, from Bulletin of the Bureau of Fisheries, vol. 33, 1913, pp. 177-190, pl. xvi-xix.

Fish which prevent malaria introduced into England (*Girardinus poeciloides*). From: "Notes" in Nature, vol. 78, no. 2022, July 30, 1908, p. 303.

Gilchrist, J. D. F. Introduction of "Millions."¹ (In Province of the Cape of Good Hope. Marine Biological report. Cape Town. 1913. No. 1, p. 67.)

Ballou, H. A. Millions of mosquitoes. (Bridgetown) 1908. 2 pl., 4, 16 p. illus. (Imperial Department of Agriculture for the West Indies. Pamphlets series No. 55.)

Ballou, H. A. Malaria in the West Indies. In: Science. N. T. Vol. XXVIII, No. 729, p. 885. *Girardinus poeciloides*.

Fish eat mosquito eggs. The Fishing Gazette, vol. 24, No. 43. Oct. 26, 1907. pp. 1014. New York.

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The following outline of questions necessary for accurate history taking in syphilis is that in use for the instruction of students in the syphilis department of the medical clinic of the Johns Hopkins Hospital. It is believed that this outline, which is contributed by the Division of Venereal Diseases, United States Public Health Service, may be of interest to naval medical officers.

In so protean a disease as syphilis, accurate history taking is imperative. In many instances, a diagnosis of syphilis must stand or fall on the information elicited by questioning. It is daily our experience to meet with individuals who tell a story of a previous genital sore, diagnosed elsewhere as syphilis and treated with a little mercury or a few arsphenamines. Such a patient may desire in-

formation as to whether or not he is cured. A thorough clinical and laboratory examination fails to reveal any evidence of syphilis, and it then becomes necessary to decide whether the original diagnosis was correct and if the patient actually had syphilis. Inasmuch as the majority of patients in this group have been given pitifully inadequate treatment, it is obvious that the whole future course will depend on a proper decision. This can only be arrived at by a correct interpretation of accurate questioning.

We have frequently found it necessary to deplore looseness of terms in history taking. Such statements as "the patient had a chancre in 1898" are not permitted in our work. The examiner must use the term "genital sore," with a careful description of its characteristics, and is allowed to use the term "chancre" only after his own mind is made up as to the accuracy of the statement.

We have found the outline given below to be of the utmost value in our own work. It must be used, of course, as an addition to the usual questions asked in taking a routine medical history, including particularly amnesic data relating to the cardio-respiratory, gastrointestinal, and genito-urinary systems.

A series of questions is suggested, study of which will bring out the essential factors. In a history of syphilis it is important to state answers either positively or negatively. Where definite lesions are present a complete description should be given.

Syphilis may be either congenital or acquired. When congenital syphilis is suspected the family history is of the utmost importance. In acquired syphilis it is necessary only in so far as direct communication of the disease to other members of the family is concerned (marital history). Questions will depend upon the stage of the disease; in a patient with a chancre questions as to tertiary and neurosyphilis are superfluous; on the other hand, in a suspected tabes, for example, all of the points below should be considered. Not infrequently a patient will have no knowledge of the nature of his illness, previous manifestations having been overlooked or misinterpreted, and it then becomes necessary to reconstruct a history of syphilis from data given or implied in the patient's statements and from replies to well-directed questions.

Family history.—(a) If congenital syphilis is suspected, the history is often better obtained from parents or close relatives than from the patient.

Father and mother? If living, age and state of health? Have they been examined for syphilis and with what result? If dead, age at and cause of death with particular reference to "strokes," paralyses, "softening of the brain," locomotor ataxia, insanity, heart disease, rheumatism? The order and result of pregnancies in the family with dates? How many stillborn? How many miscarriages

(important)? Duration of pregnancy at time of miscarriage? Time relation of miscarriages to other pregnancies? Brothers and sisters living? Age and state of health of each? Did any ever have snuffles or cold in the head at or shortly after birth, generalized skin rash, peeling eruption on the palms and soles, or sores about the mouth and anus early in life? Any other eruptions in early childhood? Any eye trouble (interstitial keratitis)? Any ear trouble? Any bone trouble (periostitis)? Swollen joints? Notching of second teeth? Convulsions, idiocy, or feeble mindedness? Have the living children been examined for syphilis and with what result? Brothers and sisters dead. How many? Age at and cause of death?

(b) If acquired syphilis: Is patient married? How long? Age and state of health of partner? Symptoms of syphilis in partner? Pregnancies, how many, order of occurrence, and what result? Number of miscarriages, stillbirths, deaths in infancy? Indicate in the scheme if possible the point when syphilis enters the family history. Living children, name, age, and sex of each? Any manifestations of congenital syphilis in offspring (see above)? Have the living children been examined for syphilis? What result? (In the colored race it is well to inquire for pregnancies regardless of marital state.)

History of syphilis.—Proceed by a definite routine, as suggested by the following outline. The method differs somewhat in males and females, and in early and late cases.

Primary (male): When did the patient have a genital sore? (Do not use the word "chancre.") Its location on the penis or elsewhere on the genitalia (frequency of chancroids at the frenum)? Its time relation to sexual exposure if definitely obtainable? Who was the partner—professional prostitute, street walker, friend, wife, etc.? (Be tactful in questions about wife or husband.) Was the sore single or multiple? Painless or painful? Shape round or irregular? Size? Spreading rapidly or not? Base clean or dirty? Much discharge; and if so, character? Hard or soft to touch? Elevated or depressed? Color? How long did it last? Complicated by bubo? If so, was this painful or painless? Did it break down and suppurate? Was it incised? Unilateral or bilateral? Did the patient show the sore to a physician? His name? How soon after the onset? His diagnosis? Was a dark-field examination made? Result of this? What was the treatment—local or general (see below)? What effect did treatment have on the sore? Was a Wassermann done; and if so, with what result? Has the patient ever had more than one genital sore? If so, date and character of each (see above)? If he denies sore altogether, did he ever have gonorrhea (strain, clap)? How long did it last and what were

its complications (endourethral chancre)? If he denies all possible primary genital lesions, did he ever have secondaries (see below)? Is there a history of a possible extra-genital primary (lips, tongue, tonsils, fingers)? Its characteristics (see above with special reference to satellite adenopathy)?

Primary (female): In females the history of a primary sore is often difficult or impossible to obtain, because so many occur without the patient's knowledge (cervix, vagina, small sores on nymphæ; etc.). Were there any sores about the privates? Their characteristics (see above)? If not, was there ever a vaginal discharge? When, and what was its duration and character? Any symptoms pointing to a Neisser infection (dysuria, redness, swelling and pain of the genitalia, pelvic inflammatory disease, etc.)?

Secondary manifestations (no difference in men and women): Cutaneous rash? Its time relation to a possible primary? Its distribution? Character of lesions? Color? Elevated or not? Itching? Other subjective symptoms? Duration? Sores in the mouth? Their relation to tobacco? Their location (lips, tongue, etc.)? Their character? Sore throat? Sores about the anus or genitalia? Their character—elevated, ulcers, piles, etc.? Alopecia? Headache? Its severity? Worse at night or in the day time? (Syphilitic pain is practically always worse at night.) Its duration? Malaise? Fever? Bone (osteocopic) pains? What bones? Worse at night? Were bones tender to touch? Any joints involved? Inflammation of eyes? Any glandular swelling? Were any of these lesions seen by a physician? His diagnosis? Treatment? Its effect on lesions?

Tertiary manifestations (inquire for lesions occurring one to seven years or more after onset of disease): Time of appearance of lesions? Their distribution (asymmetry)? Eruptions anywhere on the body? Their character? Ulcers? Periostitis? Painful swelling (especially on exposed bones such as cranial bones, clavicles, sternum, ribs, tibiæ, and ulnæ? Their chronicity? Their relation to trauma? Their tendency to heal and break down again? Tissue loss? Scars, pigmented or not? "Rheumatism"? Persistent headache worse at night? Sore throat? Aphonia? Fluid regurgitation through the nose? Loss of weight? Feeling of below par? Any visceral complaints? (The necessity of inquiring of every case the essential points in the medical history relating to respiratory, gastro-intestinal, and genito-urinary tracts, and especially the cardio-vascular system, is again emphasized.)

Neurosyphilis (the order of appearance of symptoms is of great importance): Headache? Location and character? Intermittent or continuous? Worse at night? Scalp tenderness? Vertigo? Difficulty with sense of smell? With vision? Diplopia? Noticeable squint? Difference in vision between day and night? Trigeminal

neuralgia? Facial weakness or paralysis? Deafness, unilateral or bilateral, complete or incomplete, onset sudden or gradual? Tinnitus? Difficulty with taste? Speech defect? Trouble with swallowing? Difficulty in walking? More marked at night? Tendency to stumble going upstairs? More definite ataxia in upper or lower extremities? Lightning pains? More indefinite rheumatic pains? Girdle pains? Girdle sensation? Paraesthesias in hands or feet? Gastric upsets (crises)? Constipation? Bladder trouble—difficulty in starting or completing flow of urine? Loss of sexual desire? Of sexual power (libido and potentia)? Joint trouble (Charcot)? Aphasia, transient or permanent? Paralyzes partial or complete? Hemiplegia? Changes in mentality? Changes for the worse in habits and personal appearance? Disposition belligerent? Over-talkative? Delusions of grandeur? Of persecution? Hallucinations? Subjective loss of memory? Inability to concentrate? Change in writing? Tremor? Any more vague complaints referable to the nervous system? Loss of weight?

Laboratory examinations: Were Wassermanns made at any stage? If so, where, by whom, with what result, on what dates, more especially the last? Has the spinal fluid ever been examined? What was the result?

Treatment: An accurate outline of previous treatment should be attempted. By whom administered? Local or general? What drugs? As exactly, as possible, what dates was it given? Determine preparation of drugs used, dosage, interval between doses of arsphenamine, effect of treatment on lesions, and whether treatment was intermittent, continuous, or unsystematic.

Some experiments on the chlorination of milk are reported by Captain R. A. Mansell, R. A. M. C., in the November issue of the Journal of the Royal Army Medical Corps. They were designed to discover whether or not milk could be kept from becoming sour during the hot weather in India by some cheaper, easier, and more reliable method than that of boiling.

The milk employed had been pasteurized and the observations were made at temperatures varying between 80° and 100° F. Fifteen minutes before chlorinization a measured dose of certain bacteria was added to the milk in the form of an emulsion of a 24-hour-old living culture. The chlorine was used in the form of a solution of bleaching powder giving on titration 1.87 per cent of available chlorine. For the estimation of the colony content of the milk measured quantities were plated on agar in Petrie dishes half an hour after chlorination.

The results of these experiments are of value to medical officers on duty in remote tropical stations where modern methods of handling fresh milk do not exist.

With regard to smell and taste it appears that with the addition of 3 cubic centimeters of solution chlorine is noticeable at the end of three hours, but is not usually recognizable after that time, though a trace of free chlorine can be demonstrated chemically when it does not appear to be appreciable to the most sensitive palate.

Two cubic centimeters of chlorine solution per 100 cubic centimeters of milk will keep the sample sweet at room temperature from 30 to 36 hours.

The separation of the cream appears not to be changed by the addition of chlorine.

Infected milk may be rendered safe for consumption. The most commonly surviving organisms after chlorination are *B. acidi lactici* and *B. lactis aerogenes*.

The causes of arthritis, says Thomas McCrae, Magee professor of practice of medicine at Jefferson Medical College, Philadelphia, in an address before the Kings County Medical Society, can be divided into two great groups, the metabolic and the infectious. The metabolic arthritides are not common, and we have such underlying conditions as serum reactions (anaphylaxis), hemophilia, and the so-called Charcot joint (a metabolic disturbance of syphilitic (?) origin). The cases of arthritis most commonly met with are those caused by infection, and we find cases of acute joint involvement frequently in scarlet fever, pneumonia, tonsillitis, gonorrhea, and other diseases. Gonorrheal arthritis is a very common joint infection, and contrary to popular teaching it is never nonarticular at the onset. The speaker stressed the point of single joint involvement in gonorrheal arthritis and indicated that a careful history will almost always show the fact that in the beginning more than a single joint was involved. When cases are seen, however, by the medical man they are usually acute or subacute, and the infection has usually attacked one joint more severely than the others, and, due to the localization of the infection in one joint, the slight involvement of others is overlooked. This, no doubt, accounts for the popular fallacy being taught to medical students and used by physicians as a point in differential diagnosis. The correct diagnosis of affections involving joints depends upon a well-taken anamnesis, and a systematic correlation of etiological, symptomatic, anatomical, and pathological findings. The chronic joint condition falls into the hands of the surgeon, the acute is seen by the general practitioner.

The speaker impressed upon his audience the advisability of dropping the use of the term "rheumatism." To one physician rheumatism means acute articular rheumatism, to another, acute rheumatic fever, and to a third, any ache or pain found in any part of the body.

Observant and experienced physicians will conclude, says an editorial writer in the *American Journal of Surgery* of November, 1922, that most cases of persistent pain in the upper arm, so often treated for "rheumatism" and "neuritis," are surgical affections, at least in that they require mechanical treatment.

In the absence of arthritis or of symptoms in other parts of the body, the diagnosis of rheumatism, as an explanation of pain in the arm, is quite untenable. Brachial neuritis is a real condition but a comparatively uncommon one. When well established, it should be marked by motor, trophic, or sensory signs, as well as by nerve tenderness. In all cases it is important to determine, by careful examination, including roentgenography, whether the neuritis is not stimulated or produced by some other lesion. Pain in the left arm, usually referred especially to the flexor aspects of the elbow and wrist, may be associated with an anginal condition and, as such, may be symptomatic, among other things, of tobacco poisoning.

Of the surgical conditions, aside from grosser and more evident lesions, that cause pain in the arm, we must bear in mind cervical rib (and other sources of brachial nerve pressure), fracture of the greater tuberosity of the humerus (which may occur from comparatively mild internal as well as external violence), spontaneously reduced luxation of the shoulder, subluxation of the shoulder (either of which may be produced in some persons by slight violence), sprain of the shoulder, periostitis of syphilitic or other origin, and neoplastic and inflammatory diseases of the bones, especially the humerus (among which chronic bone abscess, cortical or medullary, should be mentioned as an occasional cause of severe, persistent pain.) More common than any or all of these causes of pain in the arm and sometimes, but by no means always, also in the shoulder, is subdeltoid (subacromial) bursitis. It is, indeed, so often the cause of the complaint, that it should be thought of first—especially when there is, but even when there is not, more or less "stiffness" of the shoulder.

The discovery of occult blood by chemical means frequently is a very important procedure and has exercised the ingenuity of laboratory men for years. The guaiacum and the benzidine tests have been in common use, but seem now to be superseded by the pyramidon test, which was discovered by Thévenon and Rolland.

According to The British Medical Journal for June 10, 1922 (Epitome, p. 92), A. Fortwaengler (Zentralbl. f. inn. Med., May 13, 1922) confirms the claims of other authors concerning pyramidon which has proved to be a very delicate test for the presence of occult blood. The solutions required for the test are:

1. Pyramidon 5, alcohol (95 per cent) 100.
2. Glacial acetic acid 25, distilled water to 50.
3. Hydrogen peroxide 3 per cent.

The original method was as follows:

To 2 or 3 cubic centimeters of the fluid to be examined were added 6 to 8 drops of acetic acid solution, 2 cubic centimeters of pyramidon solution, and 6 or 8 drops of 3 per cent hydrogen peroxide. The appearance of a lilac color is positive for blood. The author has increased the acetic acid solution to 16 drops and the peroxide solution to 12 drops, and claims that this gives a more rapid and distinct coloration. The author finds that, while the guaiac test is only positive in a 1 to 1,000 dilution of blood, pyramidon shows blood in 1 to 21,000 dilution. The usual technique for extraction of occult blood from stomach content and feces was employed.

According to Dr. Albert M. Crance, who contributed recently a paper on the "Relation of syphilis to diagnosis and surgery" to the New York State Journal of Medicine, there are three important factors in the diagnosis of syphilis: A carefully taken history, the physical findings, and the blood (spinal fluid, Wassermann, or both). The Wassermann test is taken by the author to include provocative tests also. In the physical examination the physician should watch for the following conditions: Areas of alopecia; a slight external strabismus; ptosis of the upper lid; the reaction of the pupils to light; whitish contracted areas in the throat or scars of previous mucous patches; the teeth, especially in congenital syphilis. In the chest, if a heart lesion is found, the blood pressure on either side should be compared. A variation of 20 millimeters or more of mercury in the two arms is suggestive of aortic aneurism. The roentgenologist's findings can verify such a condition. The abdominal examination reveals little except the enlargement of the liver which is often due to syphilis. If the patellar reflexes are at all diminished or absent, they should be studied further. The skin should be observed for lesions or scars. A very obscure yet important sign is the enlargement of the epitrochlear glands. Roughening of the tibia, although suggestive, is present in so many normal individuals that it seems better to disregard it.

Many cases of obscure syphilis present no external signs. All chronic cases presenting abdominal symptoms such as those ref-

erable to the stomach, duodenum, gall bladder, appendix, etc., should be thoroughly studied and Wassermann tests taken before medical or surgical treatment is suggested. It has been demonstrated after autopsy that *Spirocheta pallida* are present in such tissues as the heart muscle, the aorta, the liver, and in certain ulcers of the stomach.

In the UNITED STATES NAVAL MEDICAL BULLETIN for March, 1922, there appeared a report of progress of the tenth revision of the United States Pharmacopœia issued by the general committee on revision, in which appeared a list of certain new articles, 27 in number, which had been recommended for the United States Pharmacopœia (Tenth). The subcommittee on scope have recommended the following additional admissions and also an additional list of United States Pharmacopœia (Ninth) titles which they recommend not to admit to the United States Pharmacopœia (Tenth).

The Committee of Revision of the Pharmacopœia of the United States of America invites comments on these recommendations, and careful consideration will be given to all communications, addressed to the chairman, 636 South Franklin Square, Philadelphia, Pa., by the special referee committee on scope, which consists of 21 physicians of the general committee of revision.

Where the recommendations of the committee do not meet with approval, and a protest is submitted, this should be accompanied by evidence and facts to substantiate the claim, in order that the referees may have all evidence before them.

The additional admissions are as follows:

Acidum lacticum.	Fluidextractum cannabls.
Aqua camphoræ.	Fluidextractum eriodictyl.
Aqua chloroformi.	Fluidextractum hyoscyami.
Aqua rosæ.	Fluidextractum rhois glabræ.
Cantharis.	Fluidextractum rosæ.
Codeinæ sulphas.	Fluidextractum senegæ.
Eugenol.	Gelatinum glycerinatum.
Extractum cannabls.	Glyceritum amyli.
Extractum colocynthidis compositum.	Hypophysis sicca.
Emplastrum plumbi.	Linimentum calcis.
Emplastrum sinapis.	Linimentum camphoræ
Elixir aromaticum.	Linimentum chloroformi.
Emulsum asafœtidæ.	Linimentum saponis.
Emulsum olei terebinthinæ.	Linimentum saponis mollis.
Extractum glycyrrhizæ.	Liquor ferri chloridi.
Extractum colchici cormi.	Liquor ferri et amonii acetatis.
Ferri sulphas granulatus.	Liquor hypophysis.
Fluidextractum colchici seminis.	Liquor iodi compositus.
Fluidextractum belladonnæ radices.	Liquor potassii citratis.
Fluidextractum huchu.	Massa hydrargyri.

Mel.
 Mel depuratum.
 Mel rosæ.
 Mistura glycyrrhizæ compositæ.
 Myristica.
 Phenolsulphonaphthalein (diagnostic).
 Pilulæ aloes.
 Pilulæ asafœtidæ.
 Pilulæ ferri carbonatis.
 Pulvis glycyrrhizæ compositus.
 Pulvis jalapæ compositus.
 Pulvis rhei compositus.
 Quininæ hydrobromidum.
 Resina jalapæ.
 Rosa gallica.
 Serum antidiphthericum.
 Spiritus aurantii compositus.
 Syrupus acidi citrici.
 Syrupus aurantii florum.
 Syrupus picis liquidæ.
 Syrupus scillæ.

Syrupus scillæ compositus.
 Syrupus senegæ.
 Syrupus tolutanum.
 Thyroxin.
 Tinctura aconiti.
 Tinctura calumbæ.
 Tinctura gambir composita.
 Tinctura kino.
 Tinctura lavandulæ composita.
 Tinctura myrrhæ.
 Tinctura nucis vomicæ.
 Tinctura opii camphorata.
 Tinctura scillæ.
 Tinctura valerianæ.
 Tinctura veratri viridis.
 Trochisci acidi tannici.
 Trochisci ammonii chloridi.
 Trochisci sodii bicarbonatis.
 Unguentum diachylon.
 Unguentum gallæ.
 Veratrum viride.

The following United States Pharmacopœia (Ninth) titles are **not** recommended for admission to the United States Pharmacopœia (Tenth Revision).

Aqua amygdalæ amaræ.
 Aqua hamamelidis.
 Aqua creosoti.
 Cinnamomum zeylanicum.
 Emulsum amygdalæ.
 Extractum cimicifugæ.
 Extractum ergotæ.
 Extractum gelsemii.
 Extractum hydrastis.
 Extractum opii.
 Extractum sumbul.
 Extractum physostigmatis.
 Extractum taraxaci.
 Extractum viburni prunifolii.
 Fluidextractum aromaticum.
 Fluidextractum aspidospermatis.
 Fluidextractum aurantii amaræ.
 Fluidextractum cimicifugæ.
 Fluidextractum digitalis.
 Fluidextractum eucalypti.
 Fluidextractum frangulæ.
 Fluidextractum gelsemii.
 Fluidextractum granati.
 Fluidextractum grindeliæ.
 Fluidextractum guaranæ.
 Fluidextractum pilocarpi.
 Fluidextractum podophylli.
 Fluidextractum sabal.

Fluidextractum sarsaparillæ.
 Fluidextractum scillæ.
 Fluidextractum spigeliæ.
 Fluidextractum staphisagriæ.
 Fluidextractum stillingiæ.
 Fluidextractum sumbul.
 Fluidextractum taraxaci.
 Fluidextractum tritici.
 Fluidextractum viburni prunifolii.
 Fluidextractum xanthoxyli.
 Gelsemium.
 Grindelia.
 Glyceritum hydrastis.
 Infusum sennæ compositum.
 Linimentum ammoniæ.
 Linimentum belladonnæ.
 Liquor ferri subsulphatis.
 Liquor plumbi subacetatis dilutus.
 Magma bismuthi.
 Sodii cyanidum.
 Sodii sulphis exsiccatus.
 Spiritus ætheris.
 Spiritus juniperi.
 Spiritus amygdalæ amaræ.
 Stillingia.
 Suprarenalum siccum.
 Syrupus acaciæ.
 Syrupus lactucaril.

Tinctura aloes.	Tinctura hydrastis.
Tinctura arnicæ.	Tinctura pyrethri.
Tinctura gelsemii.	Tinctura quassia.
Tinctura gualaci.	Tinctura lactucarii.
Tinctura gualaci ammoniata.	Tinctura sanguinaria.
Tinctura moschi.	Trituratio elaterini.
Tinctura physostigmatis.	Unguentum stramonii.

There are a few questions of admission and deletion not yet announced by the subcommittee on scope, but their final report is promised soon.

The following court-martial order is of importance to all medical officers:

*“Venereal disease: Concealment of, an offense.—*In a recent case the specification read as follows:

“‘In that * * * U. S. Navy, serving on board the U. S. S. ———, did, after having been instructed in accordance with Navy General Order Number 69, fail to report exposure and to take prophylactic treatment, on or about September 20, 1922, and did, through his own misconduct, contract a venereal disease.’

“General Order 69 of 16 September, 1921, superseded General Order 29 of 5 January, 1921, which latter order was thereupon canceled.

“A careful reading and comparison of the above orders discloses several important differences in phraseology. General Order 29 states ‘that failure to report exposure will be regarded as disobedience of orders;’ it also states that ‘where proper instructions have been given, failure to report exposure and take prophylactic treatment shall be regarded as cause for disciplinary action for disobedience of orders, and men developing venereal diseases who have not reported exposure promptly upon returning to ship or station shall be reported to the commanding officer in every instance.’ Neither of the above provisions are included in General Order 69. Thus it is seen that the disciplinary features embodied in General Order 29 were omitted from General Order 69 and in construing the latter due consideration must be given to this omission.

“It is the opinion of the department that General Order 69, in superseding General Order 29, was intended to repeal the disciplinary features of the latter, and to be merely explanatory in character and to set forth matters of instruction, advice, and warning on the subject of exposure to venereal diseases.

“Accordingly, it would seem that, in view of the advisory, rather than mandatory, character of General Order 69, disciplinary action can not properly be based upon the failure to comply with the terms thereof. However, attention is invited to the fact that concealment

of an infectious or communicable disease, which endangers the health of others, may be made the subject of trial by court-martial on the ground that such concealment under the conditions prevailing in a military service is an offense in itself and can be recognized as such even in the absence of express prohibition.

“In view of the foregoing, it is not considered that the specification alleges an offense, and the Secretary of the Navy directed that the proceedings, findings, and sentence be set aside. (File 27217-5426C, J. A. G.)”

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

DYSENTERY IN HAITI.

By J. T. BENNETT, Lieutenant, Medical Corps, United States Navy.

The term "Cholérine," as used in Haiti, is a misnomer. It is a general descriptive term for any condition having symptoms of abdominal pain and diarrhea. In my researches I have eliminated all those cases of simple diarrhea and have confined my attention only to those showing blood, pus, and mucous in the stools. I, therefore, propose to use the term "dysentery" in lieu of "cholérine" in future references in this report. The following cases have come under my observation: 1 case at Jacmel, 1 case at Petion-Ville, 17 cases at Port au Prince.

In making the research studies of these cases, the following bacteriological, serological, and pathological work has been done:

Plate culture from stool.....	190
Drop cultures from stool.....	570
Specimens obtained from stools stained and studied microscopically.....	1, 140
Subcultures.....	760
Agglutinations.....	375
Autopsies.....	4
Histological sections.....	8
Animal inoculation.....	1
Total examinations.....	3, 048

The symptoms shown by the 19 cases selected for this study have been very similar—i. e., abdominal pain, frequent stools of a sero-sanguinolent, mucosanguinolent, or gangrenous character, elevation of temperature, marked prostration, partial or complete loss of sphincter control and weakness in loins and lower limbs. The white blood count was 20,000 to 30,000 in all cases. The stools have all been similar and the pathological findings identical.

An organism agglutinated by a specific immune serum, 1:100, was isolated from the Jacmel case, the Petion-Ville case, and nine Port au Prince cases. In the remaining eight cases at Port au Prince I failed for some reason to isolate the organism. The organism isolated from the stools of the 11 cases is a short rod-shaped bacillus, nonmotile and gram-negative, corresponding culturally and morphologically to the Shiga type of dysentery bacillus. When injected into the vein of a rabbit this organism produced paralysis of the hind quarters, sphincter paralysis, and bloody mucoid colitis. The organism was again isolated from the rabbit's colon.

While I have found slight variation in the cultural characteristics of this organism as compared to the classical picture of the Shiga type of dysentery bacillus, I feel certain we are dealing with *B. dysenteriae* (Shiga). The fermentation reactions of this bacillus are similar to those of the Shiga bacillus. However, it does produce a small amount of indol whereas the Shiga bacillus does not produce any.

The organism is ingested, most likely, from water. It localizes in the colon where it produces a coagulation necrosis and pseudomembrane leading to a sloughing of the mucous surface. It elaborates a toxin which is a depressant to the nervous system. The patient dies of cardiac failure. The organisms are very numerous in the stool during the early stages of the disease, but tend to disappear later when the field is dominated again by the *B. coli* and other organisms. (This is an important factor in the patient's convalescence which I will mention again under "Treatment.")

The behavior of this organism on a mucous surface is very similar to the *B. diphtheriae*. They both produce a coagulation necrosis with sloughing. They elaborate a soluble toxin that exercises a peculiar effect on nerve tissue.

The treatment of this condition has not been very satisfactory. My feeling is that all so-called cholera mixtures that have been used so freely in Haiti are to be condemned, as they all contain opium. This important drug becomes harmful in the treatment of dysentery unless handled intelligently. In my opinion, the best treatment (I will mention serum therapy later) is judicious saline purgation, preferably the sodium sulphate, subcutaneous saline infusions, highly nutritious liquid diet, supportive measures, and absolute quiet in bed. No disease requires more careful nursing than dysentery. The saline purgative should be given 1 gram every three or four hours until free purgation has been established and then the dose is cut to just a sufficient amount to keep up voluminous watery stools. The saline produces an exosmosis in the colon which is to be desired. The

opium mixtures retard peristalsis, thereby holding the necrotic fermenting mass in the colon. And even if the *B. dysenteriae* does not kill the patient, the *B. coli* and other organisms will attack the damaged and often denuded colon with disastrous results.

I am convinced, from watching a great many agglutination reactions, that the serum therapy is just as much indicated in dysentery, where there is a definite organism, as antitoxin is in diphtheria. Many biological drug houses produce a polyvalent serum which is a horse's serum immunized against all the known varieties of *B. dysenteriae*. This could not, in my opinion, compare in therapeutic effect with a specific type serum, but it would undoubtedly do good.

Conclusions.—Dysentery in Haiti is caused by *B. dysenteriae*; the strain appears to be the Shiga type. Unfortunately my investigations did not accurately determine whether there are acid strains involved or not. The organism, wherever found, is of fecal origin. The disease is therefore spread by human feces. The epidemiology of this disease is that of bacillary dysentery.

ADDITIONAL EVIDENCE OF VALUE OF EARLY VENEREAL PROPHYLAXIS.

Since January 1, 1921, the Division of Preventive Medicine has tabulated all statistical data from Forms A relative to the value of early venereal prophylaxis. Such information has been published from time to time and, as is evidenced by the remarks made in special epidemiological, monthly sanitary, and annual sanitary reports, it has been of interest to medical officers.

In the following table it will be noted that nearly 245,000 treatments have been reported since January 1, 1921:

Organization.	Total treatments.	During first hour.			During second hour.			During third hour.			During fourth hour.		
		Treatments.	Infections.	Per cent of infections.	Treatments.	Infections.	Per cent of infections.	Treatments.	Infections.	Per cent of infections.	Treatments.	Infections.	Per cent of infections.
Atlantic Fleet.....	6,934	2,999	83	2.7	1,059	27	2.5	879	33	3.7	696	33	4.7
Pacific Fleet.....	3,993	847	24	2.8	1,147	70	6.1	695	44	6.3	524	35	6.6
Asiatic fleet.....	2,285	783	9	1.1	771	6	.7	339	4	1.1	286	1	.3
Shore stations.....	3,130	1,922	75	3.9	502	22	4.3	232	16	6.8	131	4	3.0
Quarter ending Sept. 30, 1922, entire Navy.....	16,342	6,551	191	2.9	3,479	125	3.5	2,145	97	4.5	1,637	73	4.4
Previously reported for 18 consecutive months.....	227,422	68,550	1,480	2.1	42,159	1,334	3.1	28,326	1,233	4.3	21,009	1,127	5.3
Entire navy since January 1, 1921....	243,764	75,101	1,671	2.2	45,638	1,459	3.1	30,471	1,330	4.3	22,646	1,200	5.2

Organization.	Total treatments.	During fifth hour.			During sixth hour.			During 6 to 12 hours.			Over 12 hours.		
		Treatments.	Infections.	Per cent of Infections.	Treatments.	Infections.	Per cent of Infections.	Treatments.	Infections.	Per cent of Infections.	Treatments.	Infections.	Per cent of Infections.
Atlantic Fleet.....	6,934	471	14	2.9	322	6	1.8	398	35	8.7	110	25	22.7
Pacific Fleet.....	3,993	176	9	5.1	253	33	13.0	271	36	13.2	80	8	10.0
Asiatic Fleet.....	2,285	31	3	9.6	22	2	9.0	22	1	4.5	31	2	6.4
Shore stations.....	3,130	128	14	10.9	83	4	4.8	78	9	11.5	54	1	1.8
Quarter ending Sept. 30, 1922, entire navy.....	16,342	806	40	4.9	680	45	6.6	769	81	10.5	275	36	13.0
Previously reported for 18 consecutive months.....	227,422	14,733	779	5.2	15,072	938	6.2	28,607	1,820	6.3	8,966	749	8.3
Entire navy since January 1, 1921...	243,764	15,539	819	5.2	15,752	983	6.2	29,376	1,901	6.4	9,241	785	8.4

DISCUSSION OF TABLE.

In an examination of this table and comparing it with tables published in former numbers of the NAVAL MEDICAL BULLETIN, it will be noted that the percentage of infections occurring when venereal prophylactic treatment is taken during the first hour is constantly higher at shore stations than in any of the fleets. The explanation for this is not apparent, but it may possibly be due to the fact that men at shore stations are not as well disciplined as those at sea, and therefore report the time elapsing between exposure and treatment less accurately.

As more data are accumulated, it appears as though certain fallacies occurring in former tables are smoothed over. For instance, in the table published in Bulletin No. 112, Notes on Preventive Medicine for Medical Officers, United States Navy, of November 15, 1921, the percentage of infections following prophylactic treatment gradually rose until the sixth hour. However, treatments taken between the sixth and twelfth hours after exposure were followed by a smaller percentage of infections. In the present table there is a gradual rise in the percentage of infections following treatment in direct ratio with the time elapsing between the time of exposure and treatment, with the exception of the fourth and fifth hours, which were the same.

If it may be assumed that the prophylactic packet was widely distributed in the Navy before June 1, 1922, it is rather surprising to note in the above table that the ratio of treatments within the first hour to the total number of treatments for the quarter ending September 30, 1922, was no greater than the ratio of treatments within the first hour to the total number of treatments for the previous 18 months.

The bureau had hoped, as a result of supplying material for prophylactic treatment which could be taken early, that the percentage

of infections within the first hour would be markedly reduced, for inasmuch as the time element has been clearly shown to play such an important part in this method of preventing venereal disease, it was thought that the treatment taken within about five minutes would lower the number of infections.

From the individual reports studied, it is quite evident that the medical officers are not endeavoring to obtain data relative to the value of the prophylactic tube, for on many of the reports it is stated that only prophylaxis taken in the venereal treatment room are recorded. In the future, all medical officers are requested to give on Form A as much data relative to the number of men using the prophylactic tube as is possible.

SHIP FUMIGATION.¹

[Preliminary report of the board appointed by the Surgeon General, United States Public Health Service, to investigate the subject of fumigation of ships.]

Because of the increasing requirements imposed by the quarantine laws of the United States and other countries, especially with reference to rodents, the Public Health Service has felt the need for further study of the whole subject of ship fumigation. For this reason the Surgeon General convened a board on March 1, 1922, consisting of a medical officer, a chemist, and an engineer to inquire into the subject and make recommendations.

In considering the matter the board arranged the work in two main divisions:

First. The investigation of the various gases which seem to offer advantages in ship fumigation, and experimentation regarding the production of these gases.

Second. The investigation of natural ventilation and artificial means of ventilation of ships after fumigation.

INVESTIGATION OF VARIOUS GASES FOR SHIP FUMIGATION.

The two gases which have been largely used for ship fumigation in the United States are hydrocyanic acid gas and sulphur dioxide. Each of these gases has certain advantages and disadvantages not possessed by the other. Neither is ideal. Carbon monoxide was used for a short time; but, while highly efficient, its use is restricted because of the complicated apparatus needed for its generation.

Sulphur dioxide has the advantages of being a fairly effective fumigant and of giving warning of its presence in time to allow the escape of any person within the quarters where the fumigant is being

¹ Reprinted from the United States Public Health Report of Nov. 3, 1922.

used. On the other hand, it has the disadvantage of being costly, it diffuses poorly, and is harmful to most tissues, articles of clothing, foodstuffs, seeds, etc., and the length of time for exposure—from 5 to 12 hours—is extremely important, from a financial standpoint, to the shipowners.

Hydrocyanic acid gas has the advantage of being very toxic in the percentage in which the gas is used, it is less costly than sulphur dioxide, it requires only a short period of exposure, and it does not affect foodstuffs, fabrics, clothing, etc. Its main disadvantages are that it is practically odorless and nonirritating, and that it is so highly toxic that a number of fatalities have occurred during its use.

From a study of the two gases now in use, certain requirements can be laid down which the ideal fumigant should meet. Briefly, these requirements are as follows: High toxicity; easy detection, by the senses, in sublethal concentration; harmlessness to foods; efficient penetrative qualities; nonpersistence; reasonably low cost; furnishes no fire or explosion hazard; and ease of manipulation. It should also be noncorrosive to metals and harmless to fabrics.

In determining where the experimental work should be done it was felt that on account of the wide experience of the Chemical Warfare Service of the Army with the various kinds of poison gases during the war and the familiarity of its officers with the production of such gases, the Edgewood Arsenal of that service would offer ideal facilities if such cooperation could be obtained.

When the matter was suggested to the Chief of the Chemical Warfare Service he immediately gave permission for the Public Health Service to use the facilities of the arsenal to the fullest extent and, in addition, made arrangement for the members of the board to reside at the arsenal during the actual experimental work. Certain personnel of the Chemical Warfare Service were detailed to cooperate in the experiments; others acted in an advisory capacity along special lines. The board desires to express its appreciation of the cooperation of those persons who so generously assisted in the experiments and whose work contributed in a large measure toward making the final results successful.

Before the board planned its work a brief study had been made by the Public Health Service on the use of chloracetophenone gas with hydrocyanic acid gas. These studies brought out the fact that in such a mixture the tear gas remained long after the hydrocyanic acid gas had been dispersed. It also brought out the fact that these two gases tended to "layer out"—that is, to form pockets.

CYANOGEN CHLORIDE.

In reviewing the available literature the board gave special consideration to gases containing the cyanogen molecule, as it appeared

that a number of these gases not only possessed the toxic effect of HCN, but also were tear gases. Cyanogen chloride was especially investigated, as its chemical and physiological properties seemed to conform so nearly to the requirements set down by the board. Work was therefore begun on a satisfactory method of production and a study of the practicability of its uses as a fumigant.

Methods of production.—Several tests were made with hydrochloric acid or sulphuric acid, sodium cyanide, and an oxidizing agent. The oxidizing agents which were used were manganese dioxide, sodium dichromate, sodium perchlorate and sodium chlorate. These tests gave little or no lachrimation and were unsatisfactory. Sulphuric acid, sodium cyanide and salt, with sodium chlorate as an oxidizing agent, gave considerable lachrimation, but was considered undesirable because of delayed time of lachrimation danger from fire and the predominance of hydrocyanic acid gas.

In the second series of experiments, bleach was used with hydrochloric acid and sodium cyanide. This method of production gave a very satisfactory quantity of cyanogen chloride. The main objections to this method were the danger of fire and the fact that the cyanogen chloride was given off when the bleach and cyanide were mixed, even before they were added to the acid. This method deserves further investigation.

In the third series of experiments, sodium cyanide and sodium chlorate were added to hydrochloric acid and without the addition of talc. The qualities giving the most satisfactory results per 1,000 cubic feet were:

- 4 ounces powdered sodium cyanide.
- 3 ounces sodium chlorate.
- 2 ounces talc.
- 17 fluid ounces commercial hydrochloric acid, specific gravity 1.15 to 1.20.
- 17 ounces water.

NOTE.—This formula is tentative and may be changed later.

First, the talc was mixed with the sodium chlorate, then the cyanide was added and mixed, and then the bag containing mixture was dropped into the dilute acid.

The composition of the lethal concentration as expressed in milligrams per liter is as follows:

Cyanogen chloride	0.9407
Hydrocyanic acid gas.....	.3269

The purpose of the talc is to reduce the fire and explosive hazard. The friction and impact tests on the cyanide—chlorate talc mixture carried on by the Bureau of Mines for the Public Health Service—showed that the fire and explosive hazard of the mixture was very small, except under extreme conditions not met with in actual usage.

The cyanogen chloride and hydrocyanic acid gas mixture given above fulfills the following requirements:

- (1) Toxicity: High toxicity with rodents, bats, roaches, bed-bugs. (The amount required for lice requires further experimentation.)
- (2) Detection properties: Intense lacrimation when lethal dose used. In one-eighth lethal dose (having no harmful effect on rats after exposure of one hour) lacrimation was still extreme.
- (3) No effect on foods, tobacco, fabrics, leather, and no corrosive action on metals (with the possible exception of nickel).
- (4) Efficient penetration qualities.
- (5) Nonpersistence: Gas is not more persistent with hydrocyanic acid gas, probably less so.
- (6) Reasonably low cost per 1,000 cubic feet. Cyanogen chloride mixture, \$0.088; hydrocyanic acid gas, \$0.081.
- (7) Fire and explosive hazards at minimum.

INVESTIGATION OF VENTILATION OF SHIPS.

At the request of the Surgeon General, the United States Shipping Board detailed one of its ships to the Public Health Service for the study of ventilation.

This part of the investigation has not yet been completed, but the work has been along the following general lines:

- (1) A study of the natural air currents in the holds of the ship under varying conditions of temperature, humidity, and wind velocity.
- (2) A study of the air currents set up by artificial means of ventilation, such as blowers and fans, and the arrangement of the ducts of the blowers and the location of the fans to give the best results.
- (3) A comparative study of natural ventilation and the various means of artificial ventilation in dispersing nontoxic heavy gases and cyanogen chloride.
- (4) Practical application of cyanogen chloride in fumigation of holds and quarters on shipboard.

As soon as the ventilation studies are finished, it is expected to present both the chemical and ventilation studies as a service publication.

HEALTH CONDITIONS OF THE NAVY.

Health conditions for the entire Navy were not as good for the five-week period ending February 3 as for the previous four-week period. The average annual admission rate, all causes, for the former period was 774 per 1,000. This increase in annual admission rate was due largely to influenza, tonsillitis, and bronchitis; the average

annual admission rate for these diseases being 109 per 1,000, 92 per 1,000, and 121 per 1,000, respectively.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of January, 1923, in comparison with the mean annual admission rates, month of January, for the five-year period 1918-1922, inclusive:

	January.	
	1918-1922	1923
Cerebrospinal fever.....	5.93	0
Diphtheria.....	7.40	1.45
German measles.....	10.68	.10
Influenza.....	349.51	112.21
Malaria.....	27.78	6.41
Measles.....	47.81	14.36
Mumps.....	150.92	4.75
Pneumonia.....	49.41	5.58
Scarlet fever.....	13.09	3.20
Smallpox.....	.59	0
Tuberculosis.....	12.25	2.79
Typhoid fever.....	.49	.10

Whereas the annual admission rates for the communicable diseases published in the above table are lower than the 1918-1922, inclusive, five-year norm, a comparison of this table with the table appearing in the February BULLETIN shows that the incidence of diphtheria, measles, mumps, pneumonia, and scarlet fever was higher in January than in December. Measles was most prevalent at the naval training station, San Francisco, and also, to some extent, at the naval training station, Hampton Roads, and aboard certain ships. Scarlet fever was also prevalent at the naval training station, San Francisco. The majority of cases of diphtheria were reported from the naval training station, Newport, R. I. Mumps has not been very prevalent, but a few cases have appeared on various ships. It will be noted in the above table that the incidence of malaria in the entire Navy was particularly low; in fact, as low as it has been at any time for the past three or four years.

The incidence of venereal disease, entire Navy, for the five-week period ending February 3 was rather high, the admission rate for this period being 127 per 1,000 per annum. However, the morbidity rate for the same period for shore stations was rather low—71 per 1,000 per annum.

The average mortality rate for all causes, entire Navy, for the five-week period ending February 3, was 2.7 per 1,000 per annum, which is considered abnormally low for this season of the year.

NOTES FROM THE UNITED STATES NAVAL TRAINING STATION, NAVAL
OPERATING BASE, HAMPTON ROADS, VA.

Scabies.—Attention has previously been invited to the persistent introduction of scabies to the station by means of incoming recruits. Although all precautions possible are observed by the regimental medical officer in the incoming detention unit to prevent the spread of scabies, it has been most difficult to keep the infection under control. There are usually from 10 to 20 patients afflicted with scabies under treatment in sick quarters. Experiments have been made with various kinds of treatment in an effort to find one which gives the quickest and best results. We have settled upon the use of a solution of potassium sulphurate in water, and have come to consider it a most valuable asset, and worthy to be adopted by all medical officers who have a considerable number of scabies patients to treat. This substance is a crystalline powder, which, when dissolved, gives off strong sulphur fumes, even to the extent of uniting with the lead in paint on the wall and blackening everything in the room. The method used is as follows:

Three ounces of the chemical well dissolved in 30 gallons of water in a bath tub. All patients in the ward are required to take a hot soap and water bath, and then are dipped in the solution one after another, remaining in the tub for a period of about five minutes.

No permanent, unpleasant effects are noted unless treatment is continued for too long a period. Sulphur dermatitis is not as prone to occur as with the old method of rubbing into the skin an ointment of sulphur. It has been found that dipping the patients twice a day for three days will absolutely cure the great majority of cases. Where the lesions are of long standing and the infection is extreme the use of this method, as of others, fails to give immediate results, but for the vast majority of cases it is extremely satisfactory. The cost of potassium sulphurate at this station is 50 cents per pound when bought in 50-pound lots. It is therefore economical both as to money cost and time for preparation. Our estimate of the value of this method of treatment is based upon the observation of more than 100 cases.

Treatment of hookworm disease by carbon tetrachloride.—As all previous reports from this station for several years past have shown, a large number of recruits received from Southern States are infested with hookworms. Various methods of treatment of these cases, looking to the complete elimination of the parasite, have been pursued, but it was not until the use of carbon tetrachloride was begun, as suggested by Maurice C. Hall, of the Department of Agriculture, in Washington, that we have been able to see our way to a really effective means of ridding our patients of the hookworm. As

yet we have made but a preliminary investigation of the effectiveness of this drug, but that investigation has shown that probably all worms are destroyed and eliminated by one dose. A full report will be prepared after the first hundred patients have been treated. In the meantime, however, it may be stated that we have found that the stools of patients showing a heavy infection of hookworm are found to be persistently negative for ova after the administration of one dose of 3 mils of carbon tetrachloride. One decided advantage of this treatment is that it is unnecessary to make any preliminary preparation of the patient for the receipt of the drug or to administer a purgative after the drug. There appears to be no danger from absorption, and investigations of the originator of the treatment, covering a large number of administrations, have corresponded with our results. Sometimes a moderate dizziness with headache follows shortly after administration, but this passes off within a few moments. Usually the medicine produces a large evacuation of the bowels within a few hours after administration. It is given in hard capsules, about 0.9 of 1 mil in each of three. One precaution must be observed by the patient, viz, he must not crush the capsule in his mouth, inasmuch as the fumes are prone to enter the respiratory passage and cause a very unpleasant strangling sensation.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"NEW YORK" FOR THE YEAR 1922.**

There was an epidemic of influenza of a mild type in the Pacific Coast States during February and March, 1922, and, as was to be expected, a number of cases occurred in the fleet which was at San Pedro and San Francisco during that period. The U. S. S. *New York* had 37 cases. Only one other battleship had a lower morbidity rate for this disease.

The following prophylactic steps were taken at the beginning of the epidemic: Spraying the throats of the entire crew twice a day with a 0.5 per cent solution of chlorazene; swabbing decks daily with cresol solution; keeping the men on deck in the fresh air as much as possible; and isolating (promptly) all suspects. One patient developed lobar pneumonia and was transferred to the naval hospital, Mare Island, Calif.

A mild epidemic of German measles occurred in May. Sixteen cases were admitted to the sick list, confined principally to the marine detachment, which undoubtedly was the focus of infection. Prompt isolation prevented the spread of this disease.

Venereal prophylactic tubes were obtained in June, and strenuous efforts were made to impress upon the crew the value of this pre-

ventative. The writer is of the opinion that while moral suasion may prevent a few men from exposing themselves to the danger of venereal disease, the prompt use of a prophylaxis is of much greater value. To prove this fact, it is only necessary to refer to the percentage of men who contract venereal disease during their lifetime to see how few follow the advice of total abstinence.

Notwithstanding the fact that five months of the past year was spent in Puget Sound, where the venereal diseases are very prevalent, there were only 123 cases of venereal disease contracted during the year, compared to 239 cases contracted in 1921.

A mild epidemic of impetigo contagiosa developed during the month of August, the focus of infection being a litter of kittens. There were a total of 27 cases, but as the disease did not prevent the men from performing their duty, they were not admitted to the sick list. The etiology of this epidemic was reported by C. V. Banta, pharmacist mate, first class, United States Navy, and will be published in the Pacific Fleet number of the Hospital Corps Quarterly.

While the presence of pets on board ship tends toward the contentment of the crew, these animals should be inspected by the medical officer when brought on board and kept under observation.

There were only two deaths during the year, both due to drowning. In each instance the victim was a good swimmer and had a companion, also a good swimmer, who was unable to rescue him. Both bodies were recovered. Apparently it seems impossible to prevent occasional occurrence of an accident of this character. The writer is of the opinion, however, that greater efforts should be made, particularly in the Pacific fleet, to teach all officers and men to swim.

Twenty-five recruits were received from the United States naval training station, Newport, R. I., on January 4, 1923. Their vaccination records were marked "positive" or "negative" only. As a result, it will be necessary to revaccinate these men to determine whether their reaction is "primary," "accelerated," or "immediate." It has been noted that many medical officers are not familiar with these terms as referred to in Bulletin No. 14, "Notes on Preventive Medicine for Medical Officers, United States Navy," and paragraph 2625, Manual of the Medical Department, 1922.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"NORTH DAKOTA" FOR THE YEAR 1922.**

During the year influenza became so prevalent at one time as to constitute a minor epidemic. Inclement weather and frequently changing climatic conditions and exposure to infectious influences on and off the ship were causes. Forty-three cases were admitted to the sick list from December 12 to December 27, 1922—31 during

the first six days of this period. All cases were of the respiratory type, and rarely presented serious symptoms or complications, as the cases did in the epidemic of four years ago. On reporting to the sick bay, the men complained of symptoms which characterize the ordinary grippe, or catarrhus epidemicus—headache, bone pains, muscular soreness, chilly sensations, and weakness, accompanied by pharyngeal or bronchial symptoms of varying intensity. The treatment consisted of rest in bed, laxative, liquid or light diet, hygiene of the nose, mouth, and throat, and such symptomatic treatment as was indicated. Most of the cases cleared up in from 6 to 8 days. One case developed mild bronchopneumonia, one lobar pneumonia with a slight pleurisy, and one, an otitis media.

To prevent the spread of the disease especial attention was given to cleaning and disinfection of scuttle butts, mess gear, and decks. Sputum cups were used when needed. Gauze was used as handkerchiefs and burned after use.

Venereal diseases.—The venereal disease rate during the year was rather high. This is explained, in part, by the cruise in the West Indies, where an unusually large percentage of prostitutes are infected, and by numerous changes in the personnel of the crew. When the ship sailed from Boston in May the men on board were willing to take every precaution in order to maintain the high relative standing of the ship in its venereal disease rates, as compared to other ships of the fleet. The good spirit of the men and the willingness to cooperate with the medical department was not so manifest among men received in later drafts. In December, unusual efforts were made to impress the men with the importance of starting the West Indian cruise free from venereal disease. The division officers cooperated in this and the senior medical officer talked at some length on this subject to every man on board. In spite of all this, it was not long before 5 cases of gonorrhea were admitted in one morning. Of the 15 cases of syphilis which occurred during the year, 5 were diagnosed by a plus 4 Wassermann on board the hospital ship *Relief*. Although they were all suspected of having the disease, it is likely that some might not have been so diagnosed if a confirmatory Wassermann test had not been made, for, with the exception of one which presented symptoms of locomotor ataxia, they were all obscure cases. The U. S. S. *Relief* has done work of great value for the medical department of this ship in many ways, but particularly in the line of blood examinations. Such laboratory examinations made possible the diagnosis of syphilis in several cases which had no venereal history and showed no sign of initial infection. Measures for venereal prophylaxis were generally effective when treatment was taken in time, but as there was so much heavy drinking at ports of the Isthmus of Panama and at St. Kitts,

it is not likely that the statements of the men in regard to prophylaxis are reliable.

Diseases of the respiratory system.—As the ship has several hundred more men than the complement for which she was designed there is considerable overcrowding. Under such conditions diseases of the respiratory system at times become almost epidemic. This is apt to occur when the ship, after a cruise in a mild climate, is put into dry dock during inclement weather in a northern climate and when the making of essential repairs necessitates a curtailment of the heat supply. Many of the crew are young and inexperienced and sometimes fail to wear sufficient clothing when it is necessary to use the toilet facilities ashore while the ship is in dry dock. Diseases of the respiratory tract became epidemic in the latter part of December, but at this writing (January 5, 1923) the ship has an unusually small number on the sick list, and respiratory diseases have practically disappeared.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"ARKANSAS" FOR THE YEAR 1922.**

Influenza.—The ship lay at the navy yard, New York, from November 14, 1921, until January 3, 1922, on which date she sailed for Cuban waters, arriving at Guacanayabo Bay, Cuba, on January 12. During this stay of 50 days in the navy yard three leave periods were granted to the officers and crew, and practically all of the personnel took advantage of the opportunity to visit their relatives and friends. The weather during December was very cold, damp, and windy, and there was not only a considerable amount of colds, influenza, and bronchial diseases in New York, but also in the localities visited by the officers and crew. There is little doubt that some of the men were infected before the ship left the yard. As a result of conditions aboard ship the respiratory diseases spread rapidly among the crew. Every man who appeared at the sick bay with a cold was placed in bed, not only that he might secure the advantage of rest, quiet, and active treatment but also as a means of preventing the spread of his infection to others of the crew. Those admitted with influenza did not present the symptoms that dominated the so-called Spanish type. No case under observation had the cyanosis and the distressing symptoms that marked the scourge which swept over the country during the World War; nor were any of the cases followed by influenzal pneumonia or lethargic encephalitis. The disease more nearly resembled the old "la grippe," with its headache, bone and muscle ache, and prostration.

While the ship was at Yorktown, Va., in September the crew suffered from food poisoning. This affliction was widespread, af-

fecting every division and mess of the ship. A special report was prepared and forwarded to the Bureau of Medicine and Surgery at the time. From an etiological point of view it was unfortunate that the cause of the outbreak could not be definitely established. Subsequent examinations of the apple sauce, that was considered as a possible cause, failed to reveal any swollen cans.

There has been an unusually high admission rate for injuries, which, it is believed, was in a large measure due to the carelessness of the persons injured. Nearly all of the injuries were preventable.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"IDAHO" FOR THE YEAR 1922.**

The admission rate for venereal disease for the year has been about the average. There was an increase in the incidence of these diseases, particularly gonorrhea, while the ship was in Puget Sound ports last summer. The admission rate for venereal diseases immediately dropped after the ship returned to southern California. The crew is instructed as to the dangers of these diseases during the periods set aside for first-aid instruction. It is not certain that the issuing of venereal prophylactic tubes has reduced the number of cases of venereal disease. A large percentage of the men infected claim to have used the prophylactic tubes. Probably some of these are not telling the truth, but most of them undoubtedly are, and it appears that the use of the tube, even within 15 minutes of exposure, does not always protect.

General hygienic conditions on board have been good. There has been the usual number of cases of tonsillitis scattered throughout the year. The incidence of influenza has been high owing to the two mild epidemics which occurred during the year.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF OBSERVATION
SQUADRON NO. 1, SANTO DOMINGO CITY, DOMINICAN REPUBLIC, FOR
THE YEAR 1922.**

The health of the command has been excellent. The percentage of sick was 2.68 per cent (141 sick days). The average complement was 144.6. At no time during the year has an epidemic of any disease appeared imminent.

Malaria.—Malaria was responsible for 37 sick days, which is the largest number of sick days caused by any one disease. The number of cases of malaria have been greatly reduced by constant war waged against the mosquitoes, the number of cases this year being less than half of that for the year 1921. Mosquitoes have been practically eradicated by constantly improving drainage, cutting weeds and grass,

and oiling all ditches and pools. A constant watch is kept for any standing water that might become a breeding place for mosquitoes and, if found, is either drained or kept well oiled. Whenever practicable, the drainage ditches are burned out daily, using refuse oil. Men are required to sleep under mosquito nets and regular inspections are made at night to insure that this rule is carried out. All cases of malaria are treated with quinine sulphate, 10 grains every four hours during the acute stage, followed by 10 grains each night for 60 days.

Venereal diseases.—The annual admission rate for venereal disease is considered rather high for a command of this size, and energetic efforts are being made to reduce it. About one-third of the cases of venereal disease for the year were contracted during the last six weeks of the year. This is accounted for, to a great extent, by the fact that in nearly every instance the men contracting the disease have been men recently transferred to the Tropics from the United States, and the ease with which they can obtain alcoholic drinks is believed by the writer to be a big factor in the high rate for the past few weeks. The native civil authorities are apparently indifferent to venereal-disease conditions and do little to assist in the eradication of these diseases. Prophylactic treatment is carried out in a very strict manner on the station. Prophylactic tubes are given to men who ask for them before going on liberty. Men who expose themselves and who do not have prophylactic tubes with them are given treatment, under the supervision of a hospital corpsman, upon their return to camp. All men are given repeated instructions as to the value of early prophylaxis and the proper administration of the same.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE POST DISPENSARY, MARINE BARRACKS, CHRISTIANSTED, ST. CROIX, VIRGIN ISLANDS, FOR THE YEAR 1922.

The prevailing diseases on the islands are: Elephantiasis, enteritis, amebic dysentery, trachoma, and the venereal diseases. The new municipal laws making it mandatory, under penalty of jail sentence, for all persons affected with venereal disease to take treatment is having a very favorable effect upon the incidence of these diseases. Lectures on this subject have been given to the men at various times, and the dangers of the venereal diseases have been thoroughly explained to them. The prophylactic room is open at all times, and a complete record is kept of all treatments. Seventy-seven men have received prophylactic treatment during the year. The men who are exposed and fail to take prophylactic treatment are severely dealt with.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE UNITED STATES NAVAL TRAINING STATION, NAVAL OPERATING BASE, HAMPTON ROADS, VA., FOR THE YEAR 1922.

The principal epidemiological fact of interest is the comparison of the communicable disease rate for 1922 with that of 1921. Measles and mumps practically disappeared from the station during 1922; and the annual rate per 1,000 for tonsillitis dropped from 107.39 in 1921 to 75.1 in 1922. On the other hand, the annual rate per 1,000 for influenza increased from 21.02 in 1921 to 217.9 in 1922. This was brought about by two brisk outbreaks of that disease, one in February and March, and the other in November. A total of 709 cases were admitted to the sick list with influenza.

It has seemed to the medical officers here that the station has been remarkably free from severe illnesses of any kind. Even during the outbreaks of influenza there were comparatively few very ill men, and it is believed that this is due to the fact that the practice of searching out men who were in the very early stages of the disease and placing them under treatment was instituted immediately, thereby, in many instances, preventing the development of complications. This searching-out process was placed in the hands of the various regimental medical officers who required the hospital corpsmen in the various dispensaries to make periodic trips during the day and night through each occupied bungalow and to bring to the sick bay all men who appeared to be at all ill. In this way the majority of patients were under treatment before their temperatures reached 102. All patients with influenza were kept in bed for at least two or three days after the temperatures had become normal. Very few cases of pneumonia developed among these men.

THE GOOD OLD U. S. A.¹

Sometimes we Americans get impatient and peeved at the way things are going on around us. We read of bootlegging and "dope" peddling taking place right under our noses. We read of movie actors misbehaving, of communities worried over political corruption, of coal strikes, dissatisfied labor, and disgruntled capital. Summing it all up, it may look somewhat discouraging.

It is at such times that we must call in the services of the telescope and the radio and size up the situation elsewhere.

The United States Public Health reports give us an interesting picture of some happenings in other lands.

¹ Reprinted from the Weekly Health Review, department of health, city of Detroit.

In Russia from January 1 to October 7, 1922, there occurred 83,367 cases of cholera. From January to September, inclusive, there were 369,125 cases of relapsing fever and 307,329 cases of typhus fever.

In the single month of October there were 886 cases of typhus fever and 77 deaths in the Union of South Africa.

In October, also, the island of Java reports 454 cases of plague, with 338 deaths.

Bagdad, Mesopotamia, with a population of a quarter of a million, reports 153 deaths from smallpox in October. Detroit, with four times the population, has no deaths from smallpox.

Poland, in the last week of October, had 291 cases of typhus fever. In the first four weeks of October there were 863 cases of dysentery in Poland, with 157 deaths.

From November 19 to December 2, the Madras Presidency in India reported 700 cases of the plague, with 449 deaths.

From October 2 to November 5, Valparaiso, Chile, reported 51 deaths from smallpox.

The death rates from all causes in 1919, the latest year for which complete statistics are available, show for the United States, 12.9; England and Wales, 13.7; France, 19.1; Ireland, 17.6; Italy, 19.0; Spain, 23.3; and Sweden, 14.4. It is only Australia and New Zealand which can arouse our jealousy, the former having a death rate of 12.8 and the latter 9.5.

Thus, we in this country are really free from a lot of worries that afflict others, and in spite of our perplexities we must admit that this is a pretty comfortable place to live, after all.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.
Serial No. 237-1923.

NLS EGM F 3 42022.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., January 16, 1923.

To: All medical officers.

Subject: Service numbers of enlisted men.

Reference: Articles D-9000 and D-9004, Bureau of Navigation Manual.

1. It is directed that the service number assigned men newly enlisted in the Hospital Corps and who change their rating to the Hospital Corps be reported to the Bureau of Medicine and Surgery on the Form N.M.S.H.C. 3, forwarded at time of enlistment or change of rating.

E. R. STITT.

Circular letter.
Serial No. 238-1923.

AWD MET 127039(13).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 19 January, 1923.

To: All medical officers.

Subject: Resignations.

1. In view of the frequent expression by Navy medical officers of discontent, voicing the feeling that the Naval Medical Service offers but a poor return for accepting a commission therein, the following extracts from letters and applications recently received in the Bureau of Medicine and Surgery from ex-medical officers of superior qualifications, who have recently resigned, are published for the purpose of bringing to the attention of those contemplating resignation or advising others to resign the reverse side of the picture. It is realized that present conditions, relative to the rank of the medical officer **age for age** as compared with other branches of the service, is not satisfactory; but it is evident from letters received that in spite of this and other matters of discontent, the service has attractions not balanced by civil practice. Aside from rank and emoluments, it is a pleasure to note two of these officers show that there exists a love of "the service" which evidently was not self-evident until out of the Navy.

"According to our telephone conversation, during which I asked you to be reinstated in the service and my resignation recalled, I am mailing you, as requested, my address.

"I want you to know that I realize what a great mistake I made, and if reinstated it will not happen again."

"I resigned from the Medical Corps of the Navy, effective * * * and desire very much to be reinstated. I am convinced that the Navy offers infinitely greater opportunity than civilian practice, especially in such details as apparatus for detailed study of cases in hospital.

"I feel that, knowing the advantage of the service, especially as compared with civilian practice, that I would be an efficient officer, and I am quite confident that I would dispel any discontent with the service among other junior officers with whom I might be stationed. I do not believe that there is a medical institution in the world where the apparatus and other means for expert diagnosis and treatment are as available as in the United States Navy."

"After having been detached from duty * * *, and my resignation from the service having been accepted * * *, I find that after some time of consideration that I prefer the Navy to the civilian life. I feel that I have become more adapted for work in the service and have more interest for work in it as well.

"I should very much like to reenter the service and have my resignation revoked or recalled and be reinstated with my former rank, lieutenant."

"After due consideration I find that I prefer to reenter the Medical Corps of the United States Navy.

"I regret very much of ever having resigned since I was entirely pleased with the service, and my interest for that branch of the service has become even more intense since my relations have been severed.

"If it is necessary to reenter as an assistant surgeon, I will be pleased to have an application blank forwarded me as soon as possible."

"Ever since I resigned from the Medical Corps last * * *, I have felt discontented and homesick for my old Navy friends and associations. Although

I have been in private practice but a little over * * *, I have been successful, especially in a financial way. I am also fortunate enough to own a home in a section composed mostly of doctors. Even so, I have not been particularly happy or contented. Do you think that my services would be of sufficient value to the Navy to warrant reinstatement in my former number on the list? I would appreciate very much your opinion or advice on this question."

"I am seriously considering making application for reinstatement as lieutenant, Medical Corps, United States Navy, but before doing so I would like some information on the following questions:

"1. Is my reinstatement possible?

"2. Would my previous service count on length of service after reinstatement?

"3. Would I be reinstated as lieutenant, and how many numbers would I lose if reinstated at once? I have been away from the service about * * *.

"4. Would an examination other than physical be necessary?

"I had promises of an excellent chance to make good money in civilian life at the time of my resignation but have found that they are and were but promises."

"I am taking the privilege of writing you in the hopes that something may be accomplished to aid me in a situation which to me is all important.

"* * * I resigned my commission as lieutenant, Medical Corps, United States Navy, in order to go into private practice after * * * years' service. At that time I had the idea that I would be happier in private practice and would never regret my Navy associates and naval medical work. I have given it * * * months' trial, and although I have been unusually successful in getting started and in a financial way, I am most anxious to return to the Navy, even to such an extent that it has affected my very existence and contentment of mind. I really regret to admit the facts after taking the decisive step in resigning, but I am positive that I never realized that I would be so discontented.

"I know that it will be a difficult matter for me to receive back my old number on the list in the Medical Corps, but I am living in the hopes that it can be accomplished, although it required congressional legislation. I have heard that the Navy is seeking new medical officers and I should think that my * * * of experience would be an asset in my favor."

"I have been trying ever since my return to * * * to find time to drop in to see you and pay my respects. I regret very much that it has been impossible for me to do so. I scarcely ever get away from the hospital until after your office is closed.

"I want you to know that I realize that I have made a mistake and I am very sorry that I did not take your advice and wait until next summer at least to resign. Had I done that I know that I would have continued in the service. Experience, however, is after all the best teacher, and I have certainly learned my lesson well. I see matters now in an entirely different light and the mere fact that I am writing you in this way is proof of the fact that I am deeply repentant of the whole episode. I hope that you will forgive me for disappointing you.

"I love the Navy and find myself longing for it and I doubt very much whether I will ever be satisfied any place else. I trust that you will not think me presumptuous when I ask you whether or not there is a chance of my reinstatement, and if it could be arranged, whether or not you would look with favor upon it."

E. R. STITT.

Circular letter.
Serial No. 239-1923.

WJCA:ESK 129733(14).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 26 January, 1923.

To: All naval hospitals caring for beneficiaries of the United States Veterans' Bureau.

Subject: Report of Hospital Inspection, Form 2506, United States Veterans' Bureau.

Inclosures: (1) Report of inspection, United States Veterans' Bureau Form 2506.

1. In accordance with a request from the Director of the United States Veterans' Bureau, the accompanying inclosure is forwarded to each naval hospital caring for Veterans' Bureau patients.

E. R. STITT.

Circular Letter.
Serial No. 240-1923.

WEE:SS 124957(23).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE & SURGERY,
Washington, D. C., February 5, 1923.

From: The Chief of the Bureau of Medicine and Surgery.

To: Medical officers at Navy and Marine Corps recruiting stations.

Subject: Physical examinations, inoculations and vaccinations of applicants to attend citizens' military training camps, 1923.

1. It is desired that medical officers of the Navy stationed at training stations shall cooperate in every respect in conducting physical examinations and immunizations to smallpox and typhoid and paratyphoid fevers of applicants for training in a citizens' military training camp during the summer, 1923. It is, therefore, directed that when an applicant presents himself the medical officer shall complete the physical examination as set forth in the application blank, which will be presented by the candidate.

2. Upon completion of the physical examination, the papers will be returned to the applicant who will forward them to the corps area commander. If upon receipt of the papers at corps area headquarters, it is found that the applicant has not been immunized to typhoid and paratyphoid fevers during the previous three-year period, but is otherwise qualified for training, the necessary typhoid-paratyphoid vaccine will be forwarded to the medical officer who conducted the physical examination, and the applicant will be notified to report to him for vaccination. If it is found that the applicant requires vaccination against smallpox, he will be notified that he must be so vaccinated by a physician or he may, if he so desires, procure the vaccine by purchase or otherwise and report to the medical officer who conducted the physical examination for vaccination. When the vaccinations are completed certificates will be signed and returned to the applicant, who will dispose of them in the manner directed. The larger proportion of the examinations and vaccinations will be made during the months of March to June, inclusive.

3. The military organization within the territorial limits of the United States consists of nine corps areas. The activities in connection with the citizens' military training camps located in any corps area are under the direct control of the commanding general of that corps area. Acting under instructions from the War Department, each corps area commander will communicate

with the officers of the Navy at the designated stations and will furnish them information relative to the location of camps, and other data as may be pertinent.

E. R. STITT.

WSG 132589(22).

Circular letter.

Serial No. 241-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 8, 1923.

To: All naval hospitals, naval medical supply depots, naval medical school, U. S. S. *Mercy*, and U. S. S. *Relief*.

Subject: An act making appropriations for the Navy Department and the naval service for the fiscal year ending June 30, 1924, and for other purposes (approved January 22, 1923).

References: (a) Alnav 28, 4320-1230, June 30, 1922.

(b) S. & A. letter #147-44-E, December 30, 1922.

(c) This bureau's letter #132586(63), 9th ultimo.

Inclosure: (a) Copy of above-mentioned act (H. R. 13374) (Public—No. 384—67th Congress).

1. The bureau incloses herewith two copies of the act above mentioned, and directs that they be made available to all members of the staff, including hospital corpsmen engaged on office work.

2. An accurate knowledge of appropriational matters is essential to the proper allocation of charges; that such knowledge is not widespread throughout the Medical Department is evidenced by the large number of invoices received in the Bureau of Supplies and Accounts, and referred here for correction, on which the wrong appropriations of this bureau are debited.

3. The appropriations pertaining strictly to this bureau will be found on pages 15, 16, and 17 of the inclosed act.

4. The appropriation "Care of hospital patients" will continue under the immediate and direct control of the bureau, and under no circumstances will any charges be placed against it except by specific authority from the bureau.

5. Restrictive legislation relating to passenger-carrying vehicles will be found on page 17 of the act, under Maintenance, Yards, and Docks.

6. The value of commuted rations stopped on account of sick in hospitals is fixed for the fiscal year 1924 at 75 cents (p. 14); this rate for three meals will govern the charges made against the pay of civilian employees for subsistence; it will also be the rate of charge in the duty-officers' mess; the charge for less than three meals in all cases will be 25 cents per meal.

7. The pay and allowances of members of the Nurse Corps, with new language "including assistant superintendents, directors, and assistant directors," will be found on page 13 of the act.

8. On page 14 of the act, provision is made for "subsistence in kind at hospitals and on board ship in lieu of subsistence allowance of female nurses"; the Assistant Secretary of the Navy in Alnav 28 (reference a) directed that at hospitals and aboard ship nurses should be subsisted "in kind as heretofore"; the Bureau of Supplies and Accounts (reference b) has defined the words "Subsisted in kind" as applied to nurses in this connection, as follows:

"(a) Nurses attached to ships are subsisted in kind when they are subsisted at the expense of the Government by being furnished meals, either directly by the commissary officer or in an officers' mess. * * *."

"(b) Nurses subsisted in kind at hospitals are subsisted by the commissary officer as a direct charge to the * * * naval-hospital fund, which * * * is subsequently credited, and provisions, Navy, charged upon vouchers prepared by the Bureau of Medicine and Surgery * * *."

This Supplies and Accounts letter, just quoted in part (reference b), was forwarded to all hospitals and the *Relief* and *Mercy* by the bureau's letter (reference c) of the 9th ultimo.

E. R. STITT.

Circular Letter.
Serial No. 242-1923.

126472(21).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 9 February, 1923.

To: All naval hospitals.

Subject: Admission of dependents of officers and enlisted men as supernumeraries at naval hospitals.

Reference: Bureau's letter #132687-O(102), October 12, 1922.

1. It appears that in some instances the above-mentioned letter has been erroneously interpreted as modifying instructions relative to the admission of supernumeraries.

2. Those legally entitled to treatment and subsistence in naval hospitals are:

- (a) The personnel of the "regular" Navy and Marine Corps, active and retired, and certain classes of the fleet reserve.
- (b) Pensioners who relinquish their pensions while in hospital.
- (c) Enlisted men whose enlistments expire after admission to hospital.
- (d) Civil employees injured in Government establishments, admitted by direction of Compensation Commission.
- (e) Veterans' Bureau patients.

3. The bureau would be favorably inclined to provide for the care and treatment of dependents to the extent of its available personnel and equipment at the various hospitals, but in the absence of legal authority and of a specific appropriation available for this purpose, the admission of these dependents is not authorized except when necessary for humanitarian, emergency, or public health reasons.

E. R. STITT.

VITAL STATISTICS.

The "Monthly Health Index," which is published on the 15th of each month, contains the statistical data for individual ships and shore stations. The statistics appearing in this BULLETIN are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{365}{x}$ or $\frac{52}{y}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

26384-23-9

TABLE No. 1.—*Monthly report of Morbidity in the United States Navy and Marine Corps for the month of January, 1923.*

	Entire navy.	Forces afloat.	Forces ashore.	Marine corps.
Complement.....	116,143	73,043	43,100	20,782
All causes:				
Number of admissions.....	7,782	3,927	3,855	1,351
Annual rate per 1,000.....	804.04	645.15	1,073.31	676.04
Disease only:				
Number of admissions.....	7,181	3,608	3,573	1,218
Annual rate per 1,000.....	741.94	592.75	994.79	609.49
Injuries and poisons:				
Number of admissions.....	601	319	282	133
Annual rate per 1,000.....	62.10	62.41	78.51	66.55
Communicable disease (exclusive of venereal disease):				
Number of admissions.....	1,513	937	576	244
Annual rate per 1,000.....	156.32	153.93	160.37	122.09
Venereal disease:				
Number of admissions.....	1,266	852	414	249
Annual rate per 1,000.....	130.80	139.97	115.27	124.60

TABLE No. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of January, 1923.*

	Forces afloat, Navy and Marines (complement), 73,043.		Forces ashore, Navy and Marines (complement), 43,100.		Total (complement), 116,143.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases.....	3,608	592.75	3,573	994.79	7,181	741.94
Injuries and poisons.....	319	52.41	282	78.51	601	62.10
Total.....	3,927	645.15	3,855	1,073.31	7,782	804.04
Class III:						
Appendicitis, acute.....	35	5.75	43	11.97	78	8.06
Autointoxication, intestinal.....	10	1.64	3	.84	13	1.34
Cholangitis, acute.....	21	3.45	13	3.62	34	3.51
Cholecystitis, acute.....	1	.16	3	.84	4	.41
Cholelithiasis.....	1	.16	2	.56	3	.31
Colitis, acute.....	0	0	2	.56	2	.21
Constipation.....	15	2.46	17	4.73	32	3.31
Enteritis, acute.....	7	1.15	11	3.06	18	1.86
Gastritis, acute catarrhal.....	11	1.81	12	3.34	23	2.38
Gastroenteritis.....	18	2.96	17	4.73	35	3.62
Hemorrhoids.....	25	4.11	18	5.01	43	4.44
Pharyngitis, acute.....	29	4.76	15	4.18	44	4.55
Ulcer of duodenum.....	1	.16	4	1.11	5	.52
Ulcer of rectum.....	1	.16	0	0	1	.10
Ulcer of stomach.....	1	.16	0	0	1	.10
Total.....	176	28.91	160	44.55	336	34.72
Class VII:						
Varicocele.....	8	1.31	16	4.45	24	2.48
Class VIII:						
Chicken pox.....	11	1.81	6	1.67	17	1.76
Diphtheria.....	1	.16	13	3.62	14	1.45
German measles.....	1	.16	0	0	1	.10
Influenza.....	701	115.16	385	107.19	1,086	112.21
Measles.....	127	20.86	12	3.34	139	14.36
Mumps.....	37	6.08	9	2.51	46	4.75
Pneumonia, broncho.....	8	1.31	7	1.95	15	1.55
Pneumonia, lobar.....	13	2.13	26	7.24	39	4.03
Scarlet fever.....	2	.33	29	8.07	31	3.20
Whooping cough.....	0	0	1	.28	1	.10
Total.....	901	148.02	488	135.87	1,389	143.51

TABLE NO. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of January, 1923—Continued.*

	Forces afloat, Navy and Marines (complement), 73,043.		Forces ashore, Navy and Marines (complement), 43,100.		Total (complement), 116,143.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class IX:						
Dysentery bacillary.....	0	0	1	.28	1	.10
Dysentery, entamebic.....	3	.49	4	1.11	7	.72
Typhoid fever.....	0	0	1	.28	1	.10
Total.....	3	.49	6	1.67	9	.93
Class X:						
Dengue.....	11	1.81	34	9.47	45	4.65
Filariasis.....	0	0	1	.28	1	.10
Malaria.....	15	2.46	47	13.09	62	6.41
Total.....	26	4.27	62	17.26	108	11.16
Class XI:						
Tuberculosis (all forms).....	7	1.15	20	5.57	27	2.79
Class XII:						
Chancroid.....	175	28.75	85	23.67	260	26.86
Gonococcus infections.....	506	97.91	246	68.49	842	87.00
Syphilis.....	81	13.31	83	23.11	164	16.94
Total.....	852	139.97	414	115.27	1,266	130.80
Class XVIII:						
Bronchitis, acute.....	470	77.21	694	193.22	1,164	120.26
Laryngitis, acute.....	8	1.31	22	6.13	30	3.10
Pleurisy, acute fibrinous.....	12	1.97	9	2.51	21	2.17
Rhinitis, acute.....	28	4.60	66	18.38	94	9.71
Tonsillitis, acute follicular.....	390	64.07	352	98.00	742	76.66
Total.....	908	149.17	1,143	318.23	2,051	211.91
Class XX:						
Herniæ.....	26	4.27	35	9.74	61	6.30

TABLE NO. 3.—*Summary of annual admission rates for venereal diseases reported from ships for December, 1922, and from various shore stations for the five-week period, December 31, 1922, to January 3, 1923, inclusive.*

	Annual rate per 1,000 December, 1922.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	0	126.71	1,169.23	18.15	176.92	1,215.19
Battleship and cruiser force:						
Atlantic Fleet.....	31.52	150.85	511.97	61.30	154.04	332.67
Pacific Fleet.....	7.73	62.31	164.65	63.79	137.40	465.45
Asiatic Fleet.....	1,169.23	1,169.23	1,169.23	435.23	427.90	560.13
Destroyer force:						
Atlantic Fleet.....	0	229.44	939.13	27.71	190.04	512.19
Pacific Fleet.....	0	63.08	237.62	25.21	99.50	607.59
Asiatic Fleet.....	0	216.09	535.71	97.56	454.71	1,044.64
Miscellaneous force:						
Atlantic Fleet.....	0	169.31	1,116.28	21.01	160.42	731.71
Pacific Fleet.....	0	75.23	521.74	18.15	119.36	521.35
Asiatic Fleet.....	0	177.71	1,028.57	85.71	490.91	1,215.19

TABLE No. 3.—Summary of annual admission rates for venereal diseases reported from ships for December, 1922, and from various shore stations for the five-week period, December 31, 1922, to January 3, 1923, inclusive—Contd.

	Annual rate per 1,000 Dec. 31, 1922-Feb. 3, 1923.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States....	0	74.72	381.02	0	79.22	227.48
First naval district.....	25.74	52.72	72.60	23.90	61.95	212.01
Third naval district.....	23.90	97.32	193.66	22.64	102.11	205.48
Fourth naval district.....	128.39	211.72	381.02	71.42	251.69	292.11
Fifth naval district.....	59.77	78.02	110.24	38.09	72.71	227.48
Sixth naval district.....	0	45.21	48.04	49.85	47.71	76.92
Seventh naval district.....	0	0	0	0	0	0
Eighth naval district.....	57.45	59.49	69.33	80.00	118.81	97.83
Ninth naval district.....	48.99	48.99	48.99	83.52	83.52	83.52
Eleventh naval district.....	0	32.16	84.33	10.00	32.48	84.27
Twelfth naval district.....	31.61	92.76	131.24	51.28	111.38	126.33
Thirteenth naval district.....	77.39	38.38	83.20	51.07	42.79	97.56

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent December, 1922.		Per cent since July 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships.....	71.7	9.8	66.9	7.2
Battleship and cruiser force:				
Atlantic Fleet.....	77.4	10.4	68.4	8.1
Pacific Fleet.....	72.7	18.1	73.5	6.5
Asiatic Fleet.....	52.6	10.5	49.1	17.4
Destroyer force:				
Atlantic Fleet.....	75.7	7.7	75.0	5.7
Pacific Fleet.....	80.0	4.0	84.3	8.0
Asiatic Fleet.....	66.6	15.5	50.7	5.2
Miscellaneous:				
Atlantic Fleet.....	69.3	3.6	66.2	6.3
Pacific Fleet.....	72.7	13.6	73.4	12.1
Asiatic Fleet.....	42.1	5.2	55.8	4.6

	Per cent Dec. 31, 1922, to Feb. 3, 1923.		Per cent since July 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States.....	78.88	14.92	76.91	12.14
First naval district.....	90.48	4.76	84.55	8.67
Third naval district.....	72.72	9.99	77.08	12.11
Fourth naval district.....	80.00	4.00	77.61	5.22
Fifth naval district.....	67.56	25.67	67.82	18.32
Sixth naval district.....	72.72	9.09	72.22	8.32
Seventh naval district.....	0	0	0	0
Eighth naval district.....	80.00	0	58.75	10.93
Ninth naval district.....	100.00	0	97.56	0
Eleventh naval district.....	83.33	16.66	86.11	9.65
Twelfth naval district.....	94.73	5.27	81.09	13.09
Thirteenth naval district.....	100.00	0	90.00	5.00

TABLE No. 4.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the five-week period, December 31, 1922, to February 3, 1923, inclusive.*

Classes.	Navy (complement), 95,361.		Marine Corps (complement), 20,782.		Total (complement), 116,143.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood.....	1	.11	0	0	1	.09
Diseases of circulatory system.....	80	8.72	6	3.00	86	7.70
Diseases of digestive system.....	578	63.03	125	62.55	703	62.95
Diseases of ductless glands and spleen.....	7	.76	0	0	7	.63
Diseases of ear.....	109	11.89	14	7.01	123	11.01
Diseases of eye and adnexa.....	78	8.51	18	9.01	96	8.60
Diseases of genito-urinary system (non-venereal).....	157	17.12	31	15.51	188	16.83
Communicable diseases transmissible by oral and nasal discharges.....	1,387	151.25	186	93.07	1,573	140.85
Communicable diseases transmissible by intestinal discharges.....	9	.98	1	.50	10	.90
Communicable diseases transmissible by insects and other anthropods.....	67	7.31	52	26.02	119	10.66
Tuberculosis (all forms).....	27	2.94	5	2.50	32	2.87
Venereal diseases.....	1,149	125.30	249	124.60	1,398	125.18
Other diseases of infective type.....	238	25.95	69	34.53	307	27.49
Diseases of lymphatic system.....	64	6.98	9	4.50	73	6.54
Diseases of mind.....	33	3.60	8	4.00	41	3.67
Diseases of motor system.....	97	10.58	29	14.51	126	11.28
Diseases of nervous system.....	59	6.43	16	8.01	75	6.72
Diseases of respiratory system.....	2,218	241.87	340	170.14	2,558	229.04
Diseases of skin, hair, and nails.....	75	8.18	20	10.01	95	8.51
Hernia.....	63	6.87	5	2.50	68	6.09
Miscellaneous diseases and conditions.....	134	14.61	22	11.01	156	13.97
Parasites (fungi and certain animal parasites).....	144	15.70	13	6.51	157	14.06
Tumors.....	8	.87	0	0	8	.72
Injuries.....	496	54.09	123	61.55	619	55.43
Poisons.....	23	2.51	10	5.00	33	2.95
Total.....	7,301	796.17	1,351	676.04	8,652	774.70

TABLE No. 5.—*Deaths reported, entire Navy, for the five-week period, December 31, 1922, to February 3, 1923, inclusive.*

Causes.	Navy (complement), 95,361.	Marine Corps (complement), 20,782.	Total (complement), 116,143.
Meningitis, cerebrospinal.....	1	0	1
Pneumonia, broncho.....	1	0	1
Pneumonia, lobar.....	5	0	5
Tuberculosis, chronic pulmonary.....	1	0	1
Influenza.....	1	0	1
Measles.....	1	0	1
Syphilis.....	1	0	1
Typhoid fever.....	1	0	1
Other diseases.....	11	0	11
Drowning.....	5	0	5
Other accidents and injuries.....	7	2	9
Poisons.....	0	1	1
Total.....	35	3	38
Annual death rate per 1,000, all causes.....	3.81	1.50	3.40
Annual death rate per 1,000, disease only.....	2.51	0	2.06

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INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE**

**ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE**

**EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY**

APRIL, 1923
(MONTHLY)



**Compiled and published under authority of Naval Appropriation Act
for 1923, approved July 1, 1922**

**WASHINGTON
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
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PREFACE.

The UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, editorial comments on current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All material supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

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No. 4

SPECIAL ARTICLES.

GLANDULAR THERAPY AND BODY GROWTH

By D. N. CARPENTER, Captain, Medical Corps, United States Navy, and D. FERGUSON, Lieutenant, Medical Corps, United States Navy.

INTRODUCTION.

An examination of the physical records of the graduating classes of 1920 and 1921 at the Naval Academy revealed the fact that approximately 10.6 per cent of each class failed to attain the minimum height for officers of 66 inches.

Since these undersized men had at admission attained standards found reasonable for their age at that time, it is obvious that during the period of development represented by their four years at the Naval Academy they failed to maintain the rate of growth they had previously exhibited or to equal that shown by their normal fellows.

An inquiry into the factors that may have contributed to the suspension of growth observed suggested but two possible causes—a familial or racial characteristic or an endocrine imbalance. As the former cause may have been primarily dependent upon the latter, it was decided to attempt growth stimulation by endocrine therapy.

The influence on growth and development exercised principally by the thyroid and pituitary glands suggested their use, and in March, 1920, a volunteer group of undersized midshipmen submitted to organotherapy with these substances.

Without attempting to determine the specific endocrinopathy, whole pituitary gland and desiccated thyroid gland were administered thrice daily. After two months of this therapy it was found that all under treatment had apparently increased their stature, the increases being from one-eighth to one and one-eighth inches. Under close observation no ill effects of any nature from therapy were discerned. At a later date when observations were checked by the use of a headgear which insured measurements in the same position, these apparent growths were found to be the result of inaccurate measuring.

These first encouraging results gave the impression that a slight or temporary or possibly an intermittent hyposecretion of the thyroid and pituitary could occur in individuals of comparatively high

physical and mental development and be manifested principally by small stature. Furthermore, the condition appeared to respond to organotherapy.

On the return from the summer practice cruise it was decided to thoroughly investigate these cases to determine (a) the degree of growth stimulation possible with organotherapy, and (b) the necessity for any changes in the regulations relative to height governing the admission of candidates to the Naval Academy.

THE ENDOCRINE GLANDS.

In the following brief résumé of the normal action of the endocrine glands concerned with growth and development, the attempt has been made to omit unconfirmed observations and experiments. For this reason the genital glands, the thymus, and others which may play a part, have not been referred to.

When one for a moment enters the realms of speculation in endocrinology, and does not subject possibilities to controlled animal experimentation, the degree of erroneous deduction may approach infinity.

The temptation to construct theories from plausible possibilities is most enticing and many have strayed from the few facts at present known to the fanciful and boundless fields of imagination.

THE PITUITARY GLAND.

A vast amount of research work has been done on the pituitary gland since its connection with acromegaly and gigantism was established.

Anterior lobe.—The present accepted teaching is that the secretion of the anterior lobe of the hypophysis regulates largely skeletal and dermal growth and modifies in some way the sexual development. Hypersecretion causes either gigantism or acromegaly, depending on the condition of the epiphyses at the time of onset, while hyposecretion may be manifested as infantilism or dwarfism.

Posterior lobe.—The secretion of the posterior lobe is a powerful vasoconstrictor, incites contraction of the involuntary muscles generally, governs largely carbohydrate metabolism, and exercises an antidiuretic effect.

The conflicting, and in some cases, diametrically opposed views regarding the relation of the component parts of the hypophysis to Fröhlich's syndrome, diabetes insipidus, forms of epilepsy, etc., are an index to the present deficient state of knowledge concerning the pituitary dyscrasias.

THE THYROID GLAND.

Morbid conditions due to an insufficiency of the thyroid secretion are characterized by a subnormal metabolic rate—protein metabolism is delayed and the amounts of total nitrogen, urea, and uric acid are less than normal, but as yet the studies of the mineral metabolism have been conflicting (5). However, in thyroid insufficiencies occurring before maturity the growth of bone is markedly inhibited, as in the frank congenital or infantile cases of myxedema and the "forme fruste" or thyropeia of Kocher, when developed in childhood.

THE PINEAL GLAND.

There is evidence indicating that the pineal gland in early life exercises a control over growth and development—an insufficiency of secretion hastening mental, physical, and sexual maturity—but the data regarding secretory disturbances *per se* is as yet inconclusive.

PLURIGLANDULAR SYNDROMES.

The various other glands of internal secretion which could affect body growth and the more or less hypothetical combinations of multiple endocrine dysfunctions are legion.

The very intimate relationship existing between the various endocrine glands and their most sensitive reaction to stimuli precludes a monoglandular dyscrasia.

The ensuing compensatory processes, on partial or temporary failure of one gland, may, apparently, call forth hyperactivity in different glands in different individuals.

This compensation may be adequate to maintain endocrine equilibrium—a purely physiological process. But when, for example, a prolonged hypopituitary dyscrasia occurs, and the thyroid attempts to compensate, by hyperfunction, the maintenance of blood pressure may result but the organism may suffer from the excessive thyroid secretion.

A very large amount of clinical observation is recorded and a wealth of conclusion drawn from it. However, there is rather a paucity of confirmed laboratory data supporting these observations, and the personal equation enters too largely in the interpretation of clinical findings.

DISCUSSION.

The brilliant results obtained with thyroid feeding in myxedema have not yet been obtained with pituitary extract in conditions due to hypopituitarism.

In Fröhlich's syndrome and diabetes insipidus many cases have been reported in which pituitary therapy yielded excellent results,

while other clinicians who have apparently handled their cases as thoroughly and well report no change on long-continued treatment with massive doses.

These discrepancies may be explained in part by the work of Romme (6), who obtained varying results with samples of pituitary preparations obtained from different manufacturing chemists.

Cushing (7) states that pituitary extract given by mouth appears to be inert. This is contested by many clinical observers.

Experimentally, Hamill (8) has shown that pituitary extract, given in solution after meals, produced characteristic uterine and intestinal contractions. Uhlenhuth (9) produced accelerated growth in amblystomae during the post-larval stage by anterior pituitary lobe feedings—the treated amblystomae averaging 264 mm. as compared with 192 mm. for controls.

Evans and Long (10), using white rats, produced accelerated growth by daily intraperitoneal injections of fresh anterior lobe beef hypophysis, but found the oral administration of the same substance ineffective.

Bailey and Bremer (11) have shown that experimentally produced lesions of the tuber cinereum with an intact pituitary gland were followed by an adiposo-genital dystrophy with constant polyuria. These findings are essentially the same as have been reported by various investigators as following partial hypophysectomy (12) (13).

Leschke (14) offers data substantiating the work of Bailey and Bremer. He further concludes that Fröhlich's syndrome has no dependence upon conditions in the hypophysis. In 41 cases of Fröhlich's syndrome he found the pituitary gland apparently normal in 18, and in the remainder the hypophyseal tissue was increased as frequently as decreased. All the cases, however, showed lesions of the midbrain. Leschke quotes Aschner as stating that genital atrophy follows wounds of the midbrain though adiposity is not always observed.

On the other hand, Gottlieb (15) concludes from a clinical and post-mortem examination of 12 cases that Fröhlich's syndrome is primarily due to hypophyseal involvement. He does not comment on midbrain lesions but states that there are some cases in which no disease results from extensive pathological conditions of the hypophysis.

Hendry (16) records the treatment of a case of Fröhlich's syndrome following a fracture of the base through the sella with whole pituitary gland orally administered and then with extract of the posterior lobe, subcutaneously. The condition remained essentially unchanged until the institution of hypodermic medication with anterior pituitary extract biweekly. This was promptly fol-

lowed by alleviation of mental dullness, increased physical strength, and the loss of 12 pounds weight in six weeks.

Ebaugh and Hoskin's (17) record their observations in a youth of 16 years suffering from Fröhlich's syndrome, with marked sexual infantilism. On pituitary (whole gland) grains 8 to 12 and thyroid-extract grains 2 per day, little physical change was noted. On adding suprarenal cortex to the medication there soon appeared evidences of sexual development.

Hoskins and Hoskins (18) have recorded data, which they regard as yet inconclusive, indicating that the administration of suprarenal cortex causes testicular hypertrophy in guinea pigs.

DIAGNOSIS OF ENDOCRINE DYSCRASIA.

In ascertaining the gland at fault, even after a careful history, physical examination and the indicated laboratory procedures, the endocrine dysfunction is often determined definitely only after the therapeutic test is made. While such empirical medication may be criticized it seems almost unavoidable in the present deficient state of our knowledge of such complexly manifesting conditions. The outstanding symptoms may or may not bear a definite relation to the primary glandular dyscrasia, but may be dependent upon an obscure secondary or compensatory dyscrasia. The degree of involvement of the various glands serves further to confuse the picture, the clear-cut, definite case being the unusual, while the most frequent seen is the type merging between two or more glandular dysfunctions.

Undoubtedly many asthenic states which present endocrine symptoms show decided improvement on endocrine therapy. It is sometimes difficult to estimate accurately how much of the improvement is due to the organotherapy, and how large a factor is the correction of bad hygiene, gross pathological conditions, and relief from an irritating environment. Also psychotherapy undoubtedly plays a not insignificant rôle.

Psychotherapy is perhaps unconsciously administered in the multitudinous questions demanding long and complete answers—thus acting as a mental purge—and in the absorption of the enthusiastic endocrinologist's ardor in his glandular extracts, about which so much interest has been lately aroused by current periodicals in their sensational, mysterious, pseudo-scientific articles, as the "monkey-gland" myth.

In the latter, rejuvenation effects are said to be apparent a year after gland transplantation although the transplanted gland has sloughed out in from three to six weeks after implantation (19). It is inconceivable how any beneficial effects could be due to anything but imagination.

DIAGNOSIS OF HYPOTHYROIDISM.

The diagnosis of hypothyroidism is given in detail as it would appear that slight degrees of this condition are not at all as infrequent as generally supposed.

Unfortunately, percentage statistics of the incidence of mild forms of thyropenia are not available, though it is generally regarded as negligible in this country. A number of recent papers have called attention to the condition (20), (21), (22), and invariably comment on how frequently it is overlooked. In the small series studied at this institution, three undoubted cases of mild thyropenia were discovered. When it is considered that the vast majority of men suffering from hypothyroidism would be unable to enter the Naval Academy because of the mental and physical requirements, it is perhaps warranted to assume that an examination of school children in different localities would reveal an appreciable percentage of cases of thyropenia.

There may well be a double significance in Cushing's ironic statement (7) that the hosts of personal peculiarities, formerly regarded as being within physiological limits, now undergoing attempted correction by the endocrinologist with some whole gland extract, but usually with a pinch of thyroid thrown in.

The number and degree of severity of the following symptoms varies widely. We know of no one or two that are pathognomonic—the carefully controlled therapeutic test apparently being our only diagnostic standby in the “forme fruste.” Even then the possibility of the general tonic action of small doses of thyroid extract on the organism as a whole and the various endocrine glands in particular must be borne in mind constantly. The diagnosis of hypothyroidism is based on the following:

From the family history.—Evidence of short, stout relatives with numerous decayed teeth; comparatively large head; with short, broad hands and feet; coarse dry skin; brittle nails; coarse, dry, brittle, and scanty hair; and idiocy (possibly unrecognized, frank congenital or infantile myxedema).

From the past personal history.—Evidence of a large child at birth who grew very slowly, or a normal child at birth who developed normally to four or five months or to a certain point, marked, perhaps, by weaning or a severe and exhaustive illness, who then gained markedly in weight but grew very slowly; late development as shown by the first tooth appearing weeks after the normal time; inability to walk or to talk in monosyllables at the age of fourteen months; impaired endurance both physical and mental; chronic constipation; late appearance of the beard; the occurrence of vague muscle pains; increased susceptibility to infection; and inability to stand moderate reductions of temperature.

Physical examination.—Physique: Stocky and squat.

Complexion: Pale or waxy, with possibly pigmentation about the face or shoulders.

Hair: Dry, coarse, fragile, and scanty hair and eyebrows.

Teeth: Many carious teeth.

Tongue: Large and thick; dry mouth and heavy lips.

Relative size of extremities and features: Relatively large, round head with short, stubby hands and feet; and the measurement from the soles to the symphysis pubis being less than half of the total height.

Skin: Dry, coarse, edematous-looking skin with lumpy subcutaneous infiltration and very susceptible to low-grade inflammatory conditions.

Sex characteristics: The psyche and voice unchanged or infantile.

Fat distribution: Padding about chin, clavicle, and loins.

Nails: Broad, brittle, easily fractured nails, showing marked longitudinal grooving.

Vaso-motor system: The usual finding is a slow rate and low blood pressure, showing a delayed response to effort and slow return to normal, although a hypertension may exist. In the latter case it may be due to the pituitary overfunctioning to compensate for the diminished thyroid secretion, and eliminating an excess of the vaso-constrictor hormone.

Roentgen: X-ray studies of the epiphysis may show delayed ossification for age.

Basal metabolic rate: Basal metabolism estimations are most important and may give the only lead to the condition. The basal metabolic rate is usually subnormal.

DIAGNOSIS OF HYPOPITUITARISM.

The symptomatology of deranged, pituitary functions, not due to tumor, is not on a definite basis. The following data are generally accepted as the manifestations of dyspituitarism and are subject to the general criticisms made of the incomplete state of knowledge regarding the pituitary dyscrasias as the foregoing contradictory evidence indicates.

From the family history: Evidence of a familial pituitary imbalance manifesting itself in acromegaly, gigantism, adiposo-genital dystrophy, or dwarfism.

From the past history: Evidence of an essentially normal child until an age around 12 years, when growth did not continue at the usual rate, and the development perhaps of inability to concentrate, mental torpor, and loss of physical endurance; exhaustive diseases which may have impaired the function of any of the endocrine

glands as shown by effect on height; a tendency to joint relaxations as shown by (a) frequent dislocations, (b) depressed arches or pronounced weak foot, (c) double-jointedness or hyper-extensibility of joints, notably phalanges and elbows; vague unrelated abdominal tenesmus occurs in some cases, and is considered due to an irregularly functioning posterior hypophyseal lobe which in hyperfunction secretes an excess of the involuntary muscle contracting hormone; an insatiable craving for sweets in any form, constantly or periodically, or during certain periods; a delayed appearance of or a very rudimentary beard.

Physical examination.—Hair: Dry, fine, fragile hair, of scanty distribution; normal or involutional type of crines pubis.

Teeth: Broad central incisors and general crowding of the teeth. Abnormal shape, size, or position of the incisors. Palatal arch: High and narrow. Taurus, or marked increase in size of transverse palatal ridges, present.

Relative size of features and extremities: Head proportionately small, pointed chin, small hand, with tapering fingers. Skin: Dry, fine, velvety, alabasterlike skin, perhaps showing some ichthyosis or morphea.

Sex characteristics: The genitalia may be normal or infantile, or in males showing evidence of feminine involution by a rudimentary labial fold; and the psyche, shape of pelvis, and fat distribution of the feminine type.

Nails: Deep, oval shape, and of fine texture.

Estimations of the basal metabolic rate show it to be normal or decreased.

X-ray examination: The pituitary fossa normal or showing a small or inclosed sella turcica. The phalanges appearing long, light, narrow, and gracile.

OUTLINE OF INVESTIGATION.

To insure uniformity of records, Forms 1, 2, 3, and 4 were prepared for a family and past personal history and for a routine physical examination, all from an endocrinological standpoint.

FORM 1.

Past, personal, and family history from parents or guardian.

NOTE—The data requested are to aid in helping the midshipman named therein to increase his stature. It is not compulsory for him to take the treatment or for the parent to fill in the form. This is entirely voluntary. Although some of the questions may appear trivial, it is requested that they be answered as fully as possible.

Midshipman _____ Class _____
(Surname to left.)
Date _____ Date of birth _____ Place of birth _____

PAST PERSONAL HISTORY.

1. Age when growth did not continue at normal rate.....
2. Approximate gain in weight during subsequent 6 months.....
3. Convulsions, if any, during {
 - Infancy
 - Childhood
 - When cutting teeth.....
 Ascribed causes
4. Age when first {
 - Tooth appeared
 - Talked
 - Stood alone
 - Walked
5. Did he take cold more frequently or more easily than most children?.....
6. Did he complain of feeling cold when other children did not apparently notice same?.....

FORM 2.

	Father.	Mother.	Brothers.	Sisters.	Paternal.				Maternal.			
					Grandfather.	Grandmother.	Uncles.	Aunts.	Grandfather.	Grandmother.	Uncles.	Aunts.
Tall (6 feet or over).....												
Medium height.....												
Short (5 feet 1 inch or below).....												
Stout (170 pounds or above).....												
Medium weight.....												
Thin (105 or below).....												
Goiter.....												
Poor teeth—numerous decayed teeth.....												
Prominent features—eyes, chin, nose.....												
Excessively large hands or feet.....												
Premature grayness of hair (30 or under).....												
Eyebrows (a) very scant, (b) meeting over nose.....												
Repeated or periodic headaches.....												
Coarse skin.....												
Dry skin.....												
Brittle nails.....												
Brittle hair.....												
Coarse hair.....												
Nervousness or nervous breakdown.....												
Insanity or idiocy.....												
.....												
.....												
.....												

FORM 3.

Personal history from midshipmen growing squad.

Midshipman..... Class.....
 (Surname to left.)
 Date.....192.....

PAST HISTORY.

Past illnesses or operations.	Age.	Duration.	Complication.	Convalescence.	Effect on height	Effect on weight.	Remarks.
.....
.....
.....
.....
.....
.....

1. Concentration at successive ages, especially 12-15.....
2. Endurance { Physical fatigue.....
Mental fatigue.....
3. Chronic constipation.....
4. Fractures and time of healing.....
5. Dislocations and ages.....
6. Joints { Cracking in walking or manipulation.....
Weak foot.....
Hyperextension of elbows and fingers.....
7. Craving for sweets, age and degree.....
8. Headache.....
9. Tonsillitis and adenoids.....
10. Muscle pains.....

FORM 4.

Midshipman..... Date.....

PHYSICAL EXAMINATION.

Complexion..... Physique..... Blood pressure.....

Texture { Dryness.....
Coarseness.....
Fragility.....
Split ends.....

1. Hair { Distribution of growth { Nasal brows.....
Age of shaving.....
Facial.....
Pectoral.....
Lumbal.....
Axillary.....
On extremities.....
Type of pubic hair.....

2. Teeth	{	Texture	{	Carious.....
				Triangular.....
				Length.....
				Shape of canines.....
				Spacing or crowding.....
3. Prognathism		Upper jaw.....		
		Lower jaw.....		
4. Tongue and lips		Size.....		
		Shape.....		
5. Pharynx		Arch.....		
		Torus.....		
6. Relative size of extremities and features				
7. Skin	{	Moisture.....		
		Temperature.....		
		Texture.....		
		Condition.....		
8. Sex characteristics	{	Development	{	Labial fold.....
				Involution.....
		Psyche.....		
		Type of pelvis.....		
		Type of fat distribution.....		
9. Nails	{	Shape.....		
		Grooving.....		
		Texture.....		
		Fractures.....		
10. Sergeant's line.....				
11. Thymic enlargement.....				
12. Cardiac function test for endurance.....				
13. X ray of long bone epiphyses.....				
14. Basal metabolism.....				
15. Differential W. B. C.	{	Infantile.....		
		Adult.....		
16. X ray of pituitary fossa.....				
17. Measurements	{	Total height.....		
		Soles to symphysis.....		
		Symphysis to vertex.....		
		Span.....		

As there was a possibility that the midshipmen being measured, by unintentional rotation of the head, gave us inexact height measurements, a headgear was devised which by a fixed-point suspension and a right-angled spirit level assured measurements in essentially the same way on each occasion.

Through the kindness of Dr. John T. King, jr., of Baltimore, we were permitted to use the basal metabolism estimation technique which he devised and subsequently described in the Bulletin of the Johns Hopkins Hospital (1).

Routine white and differential blood counts were made as a possible aid to detect evidence of a thymolymphatic state. Temperature, pulse, and blood-pressure findings were recorded in each case.

Roentgenograms of the wrist, hand, and sella turcica were made to determine, respectively, the condition of the epiphysis, the phalangeal changes of dyspituitarism, and abnormalities of the sella.

X-RAY EXAMINATIONS.

It is with great difficulty that delayed or premature ossification of the epiphysis can be determined in people near the chronological age of 20 years. The standard textbooks of anatomy and roentgenology show considerable variations in their tables of epiphyseal unions.

Dieterle's tables of the appearance of the ossification centers is satisfactory for children, but in Smith's (2) exhaustive study of the union of the radial epiphysis it was shown that this is subject to wide variations within normal limits.

TABLE 1.—*Smith's method of classifying the degree of epiphyseal union.*

- Stage 1. Complete separation.
- Stage 2. Complete separation. Few imbrications in cartilage.
- Stage 3. Imbrications extend across at one point.
- Stage 4. Thick line—wide peripheral separation.
- Stage 5. Thick line is narrow, deep peripheral notches.
- Stage 6. Thick line is narrow and is full length of bone, very slight notch;
no growth past this stage.
- Stage 7. Only portions of line and notches remain.
- Stage 8. Amalgamation complete.

In Table 1 is Smith's method of differentiating the degree of ossification at the epiphysis. This method was used as a basis of classification in this investigation, despite the wide variations demonstrated in the relation of age to the degree of ossification.

Roentgenograms of the phalanges show rather characteristic changes in some cases of endocrine dyscrasia; hypopituitarism being evidenced by tapering and light phalanges; hypothyroidism by short, stubby, broad and thick phalanges, and acromegalic changes (to be expected in the combined or Cushing type of pituitary dyscrasia of alternating hypo and hyper function), of long, thick, dense, and tufted phalanges with large tuberosities.

There has been a tendency to apply the roentgen findings of Schüller in intrasella hypophyseal tumors to dyspituitarism on more or less hypothetical grounds. An hypertrophy of either one or both lobes of the pituitary is premised, resulting in changes in the shape, size, and relation of the floor, the clinoids and depth of the

fossa. Large, small, open, and inclosed sella; dissections (compensating for hypertrophies) in one or more directions and changes in the shape of the sphenoidal sinus have been recognized and diagnostic significance attached. On the other hand, the view is held that the shape and size of the sella varies widely in different normal individuals, and this is supported by Gibson's (3) and Enfield's (4) observations. It has been shown that stereoscopic views of the sella afford a much better estimation of its condition than the single plate, in which slight cephalic rotations produce marked distortion of the shadows.

COMMENT ON DATA.

On the following pages are arranged in tabulated form the data of our completed cases.

In all, 24 cases were studied, but because of poor cooperation, a too short period of observation, and incompleteness of desired data due to illness, press of academic work, etc., we have but 14 completed cases.

The thyroid extract used was a commercial, iodine standardized tablet and the anterior pituitary extract was the desiccated anterior lobe, which was administered in a capsule followed by a full glass of water before meals.

Initial doses only are shown, as the medication was varied to suit the apparent needs of the case as shown by therapeutic response. When no response to pituitary therapy was noted it was gradually increased until one case was receiving 36 grains daily.

No evidence is elicited to show that growth was stimulated in 14 midshipman under thyroid and pituitary medication, 9 of whom were under observation for 27 months, and 5 for 17 months.

The fact that 12 cases showed complete amalgamation of the lower radial epiphysis may be responsible for our lack of results, but no accelerated growth was found in the two cases with ununited epiphysis.

Our inability to stimulate growth with anterior pituitary extract is consistent with the recent work of Drummond and Cannan (23), who were unable to confirm Robinson's earlier work (24) with Tethelin, an anterior pituitary extract which promised excellently as a growth stimulant.

Causes of underheight other than endocrine imbalance, viz, familial, racial, developmental, and dietary, were also considered.

The family histories in our cases almost invariably showed that parents and grandparents were of average height.

Data of completed cases.

Class No.	Age.	X-ray.	Type.	Positive endocrine findings.	Medications.	Average rate of monthly growth in inches.		Remarks.
						Before therapy.	After therapy.	
1.....	22	Stage 8, complete ossification; sella small, shallow, and closed.	Primary subthyroid, secondary subpituitary.	Thick, broad tongue; small hands; large head; cretinoid measurements; crowding of teeth; very low normal R. M. R.	Thyroid grs. 1; pituitary anterior lobe grs. 1.	0.0298	0.0156	No change.
2.....	22	Stage 8, complete ossification; sella small.	Subpituitary and subthyroid, latter predominating.	Short, broad spade hand; skin moderately dry and coarse; cretinoid measurements.	Thyroid and anterior pituitary of each grs. 1.	No growth.	.0260	Height, total, 62½ inches; height, soles to symphysis, 30½ inches. The apparent growth in this patient is ascribed largely to the use of systematically practiced stretching with a traction machine. Developed much more physical and mental energy on medication.
3.....	21	Stage 8, sella small, partially closed, and dissecting posteriorly.	Subthyroid.....	Hands short and broad with tapering fingers; cap size No. 7; prominent features; skin rather dry; cretinoid fat pads on fingers.	Thyroid grs. 1.....	.0204	.0078	
4.....	18	Stage 6, sella shallow and widely open.	Equal subpituitary and subthyroid.	Hair coarse but oily; teeth spaced; tongue thick and broad; skin dry but of fine texture; spade hand; cap, size 6½; lower jaw prominent; cretinoid measurements.	Thyroid and anterior pituitary of each grs. 2.	.0250	.0104	Total height, 64½ inches; height from soles to symphysis, 31½ inches; span, 66½ inches.
5.....	18	Stage 8, sella small and inclosed.	Primary subthyroid, secondary subpituitary.	Hair dry and coarse and generally excessive; began shaving at 12; cap, size 7; shoes, 6; prominent features; spade hands.	Anterior pituitary grs. 2; thyroid grs. 1.	No growth.	.0417	Felt generally improved, particularly appetite, energy, and mental concentration.

6.....	21	Stage 5, sella completely inclosed.	Subthyroid and subpituitary.	Skin dry but fine; small hands with tapering fingers; cap, size 7½; shoe, 5½.	Thyroid grs. 1; anterior pituitary grs. 2.	.0470	.0201	Felt generally improved.
7.....	23	Stage 8, sella not examined.	Levi Loraine.....	Features, cap and shoe size, and relations of all measurements equal but small.	Anterior pituitary grs. 1.	No growth.	No growth.	No change.
8.....	24	Stage 8, sella open, shallow, dissecting posteriorly.	.....do.....	Same as above plus an enlarged thyroid gland.	Anterior pituitary grs. 2.	No growth.	No growth.	Do.
9.....	21	Stage 8, sella slightly inclosed.	Definite subthyroid in infancy; additional subpituitary.	Shaving first at 19 years; total height, 63½ inches; soles to symphysis 30½ inches; skin dry over body; oily over face; acne, B. M. R. high, 34 per cent plus.	Thyroid tablets grs. 2.....	No growth.	No growth.	Appetite and concentration improved under therapy which seemed indicated in spite of high metabolic rate.
10.....	21	Stage 8.....	Equal subpituitary and subthyroid.	Shaved at 18½ years; slight prognathism; dry fine skin which bruises easily; increased B. M. R., 23 per cent plus; total height, 64 inches; soles to symphysis, 34 inches; late appearance of first tooth (11 months).	Thyroid tablets grs. 1; pituitary anterior lobe grs. 2.	.0313	No growth.	No change.
11.....	21	Stage 8, sella small, dissecting anteriorly and posteriorly.	Regarded erroneously as an equal subthyroid and subanterior pituitary (see under Remarks).	First tooth at 8 months; hyperextension of elbows and fingers; skin distinctly dry with areas of ichthyosis; tongue thick and broad; excess of fat over hips and loins; blood pressure, 90/50; marked prognathism of lower jaw with spacing of teeth; square head, tapering fingers; slightly enlarged thyroid gland.	Thyroid tablets grs. 1; pituitary grs. 1.	.0125	.0208	Developed nervousness and tachycardia in one week; thyroid discontinued; the dry skin, tongue, and shape of head suggests a hypothyroid condition; however, the low blood pressure and ichthyosis could be caused by a double hypopituitary dyscrasia which was probably partially compensated for by a very active thyroid.
12.....	22	Stage 8, sella closed and dissecting posteriorly.	Combined anterior pituitary and thyroid deficiency.	Dry, coarse hair; dry skin, normal texture, skin bruises easily; pelvic and clavicular and finger tip fat pads; intertemporal headaches.	Anterior pituitary grs. 1; thyroid grs. 2.	No growth.	No growth.	Record of the first growing squad shows that he grew 1½ inches in two months; considered fairly measurements.

Data of completed cases—Continued.

Class No.	Age	X-ray	Type	Positive endocrine findings	Medications	Average rate of monthly growth in inches.		Remarks
						Before therapy.	After therapy.	
13.....	21	Stage 8, sella normal.....	Subanterior pituitary.....	Hyperextension of elbows and fingers; hands small though spadelike; hair fine; skin moist.	Anterior pituitary grs. 2; thyroid grs. 1.	No growth.	No growth.	No change.
14.....	23	Stage 8, sella small, fossa dissecting posteriorly.	Type Cushing.....	Shaved at 18 years, hair dry and slightly coarse; prominent features; slight upper maxillary prognathism, cap size $\frac{7}{8}$; increased B. M. R. 43 per cent plus.	Anterior pituitary grs. 2; thyroid grs. 1.	No growth.	No growth.	No change in conditions.

Other than one Cuban of southern European extraction in whom underheight may be regarded as a racial characteristic, no racial cause could be elicited.

No gross evidence of infantile rickets or malnutrition was apparent, though in one case premature birth at seven months with an attendant difficult rearing might have been a factor.

Unfortunately, the dietary of this undersized group was not investigated to determine if their ration contained adequate calcium during the growing period. It is conceivable, in view of recent feeding experiments (23), that the child between the ages of 3 and 13 years who receives less than 1,000 c. c. of fresh milk per diem may become undersized because insufficient available calcium for the normal osseous growth.

COMMENT ON CASES.

The response to thyroid therapy was very gratifying in cases 3, 5, and 9. Case 5 received 1 grain daily and reported a greater capacity for mental concentration, increased physical endurance, a better appetite, and more restful sleep. In addition to his positive endocrine findings recorded in the table, the roentgen plate of his epiphysis showed a definite retardation of ossification for age. After the return from a summer practice cruise during which no medication was administered it developed that he could not tolerate one-third the former dosage of thyroid extract.

Case No. 11 was the most interesting from a diagnostic standpoint. In view of the comparatively large head, the dry skin with definite areas of ichthyosis, the thick broad tongue and cretinoid measurements, the blood pressure of 90/50, subnormal physical endurance, cretinoid fat distribution, and moderately coarse, oily hair, he was regarded as a primary thyropenia. The slightly enlarged thyroid was regarded as being the organism's response with hypertrophy to the demands made upon an inefficient thyroid.

Thyroid extract was cautiously administered and was promptly followed by the complaints of nervousness and cardiac palpitation. It was pointed out that in all probability the condition was a secondary compensatory hyperthyreosis due to a primary hypopituitary dyscrasia. The endocrine picture in this case immediately suggested combined hypopituitarism to one more experienced in endocrinology. Unfortunately, no discernible response to pituitary therapy was found.

As our results in attempted growth stimulation were nil, it became apparent that the former regulations governing the height required of candidates for admission to the Naval Academy were not sufficiently stringent.

OBSERVATIONS ON GROWTH

The examination of the records of the two classes referred to in the opening paragraph showed that a certain number of midshipmen near the minimum height for age do not continue growing at the normal rate, and in some no apparent increase in stature occurs after entering the Naval Academy.

At the annual physical examination prior to graduation a certain percentage of midshipmen are found who do not attain the minimum height for officers of 66 inches.

The records (Tables 2, 3, and 4) show that in a total of 538 midshipmen, 78 (14.5 per cent) were under 66 inches height on entrance. Of these 78 midshipmen, 21 (3.9 per cent) attained 66 inches prior to graduation. With the new regulations which require at 16 years of age a height of 62 inches and an additional inch for each year or fraction over six months, 23 candidates, or 4.27 per cent, of each class would not have been admitted to the academy.

TABLE 2.—*Tabulated growth records of midshipmen who attained 66 inches by graduation.*

	Entrance.		Height.				
	Date.	Age.	Entrance.	First annual.	Second annual.	Third annual.	Prior to graduation.
R. S. McI.....	June, 1917	16 0	64½	65½	67½	.....	68½
C. J. M.....	July, 1917	16 11	64	65½	66½	.....	67½
J. E. P.....	July, 1917	17 0	65½	65½	66½	.....	66
F. R.....	June, 1917	17 3	64½	65½	66	.....	66½
B. A.....	June, 1917	17 0	65½	65½	66	.....	66
T. H. B.....	June, 1917	16 0	65½	65½	65½	.....	66½
M. C. B.....	July, 1917	16 10	65½	65½	66½	.....	66½
W. F. F., Jr.....	July, 1917	16 7	65½	66	66½	.....	66½
N. G., Jr.....	July, 1917	16 9	65½	65½	65½	.....	66
J. C. H.....	July, 1917	17 5	65½	66	66½	.....	66½
L. L. H.....	June, 1917	16 8	65½	(?)	65½	.....	66
L. J. J.....	July, 1917	19 11	65½	65½	66	.....	66
J. G. J.....	July, 1917	17 1	65½	66½	66	.....	66
H. F. R.....	July, 1917	18 9	65½	66½	65½	.....	66
T. S.....	June, 1917	17 8	65½	65½	66½	.....	66½
R. B. T.....	Sept., 1917	16 0	63	63½	66½	.....	68½
H. E. A.....	July, 1917	16 11	65½	66½	66½	66½	67
J. C. McQ.....	July, 1917	18 0	65½	66½	66½	66½	66½
J. E. R.....	July, 1917	18 6	65½	66	65½	65½	66
E. H. W.....	June, 1917	18 9	65½	66½	66	66	66½
T. S.....	June, 1917	17 8	65½	65½	66½	.....	66½

¹ The only man who would have failed physically because of the new entrance, and subsequently attain the required height.

TABLE 3.—*Tabulated growth of midshipmen who would have been disqualified on entrance by the new regulations.*

	Entrance.		Height.				
	Date.	Age.	Entrance.	First annual.	Second annual.	Third annual.	Prior to graduation.
F. B. B.....	July, 1917	19 8	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
T. C. B.....	May, 1916	17 7	63 $\frac{3}{8}$	64	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
F. J. F.....	June, 1917	17 2	63	63 $\frac{1}{2}$	63 $\frac{3}{8}$	63 $\frac{1}{2}$	63 $\frac{5}{8}$
W. C. G.....	June, 1917	19 11	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
S. E. E. K.....	June, 1917	19 2	63 $\frac{3}{4}$	63 $\frac{3}{4}$	63 $\frac{1}{4}$	63	63 $\frac{1}{4}$
T. B. K.....	July, 1917	20 0	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
C. R. L.....	June, 1917	18 7	64 $\frac{1}{4}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
S. S. P.....	June, 1917	19 11	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{1}{4}$	65 $\frac{3}{8}$	65 $\frac{3}{8}$
E. D. P.....	June, 1917	19 11	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64	64 $\frac{1}{2}$	64 $\frac{1}{2}$
E. E. P.....	June, 1917	20 0	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{1}{8}$	65 $\frac{1}{4}$	65 $\frac{3}{8}$
L. K. S.....	July, 1917	19 10	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{8}$	65 $\frac{1}{2}$	65 $\frac{1}{2}$
R. G. W.....	July, 1917	18 10	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
W. F. B.....	Aug., 1917	17 11	61 $\frac{1}{8}$	62 $\frac{1}{8}$	62 $\frac{1}{2}$	62 $\frac{1}{4}$	62 $\frac{1}{2}$
J. J. C.....	July, 1917	19 6	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{1}{8}$	.....	65 $\frac{3}{8}$
S. B. D.....	July, 1917	19 6	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{1}{8}$	.....	65 $\frac{3}{8}$
W. P. K.....	June, 1917	19 9	64 $\frac{3}{4}$	65	64 $\frac{1}{2}$	.....	64 $\frac{3}{4}$
P. D. L.....	June, 1917	17 11	63 $\frac{3}{8}$	63 $\frac{3}{8}$	63 $\frac{1}{2}$	.....	63 $\frac{3}{8}$
L. E. M.....	June, 1916	19 3	64 $\frac{5}{8}$	64 $\frac{5}{8}$	64 $\frac{3}{8}$	64 $\frac{1}{2}$	64 $\frac{7}{8}$
E. J. M.....	June, 1917	20 1	63 $\frac{1}{2}$	(?)	63 $\frac{1}{2}$	.....	63 $\frac{1}{2}$
J. O. S.....	July, 1917	19 4	63 $\frac{3}{4}$	63 $\frac{3}{4}$	65 $\frac{3}{8}$	.....	63 $\frac{5}{8}$
J. H. S.....	Aug., 1916	19 11	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{4}$	65 $\frac{1}{2}$
R. O. T.....	June, 1917	19 1	64 $\frac{3}{8}$	64 $\frac{3}{8}$	64 $\frac{3}{8}$	.....	64 $\frac{3}{8}$
C. F. E.....	June, 1917	20 1	65 $\frac{3}{8}$	65 $\frac{1}{8}$	65 $\frac{1}{8}$	.....	65 $\frac{1}{8}$

TABLE 4.—*Tabulated growth records of midshipmen who would have passed new entrance requirements but who failed to attain 66 inches by graduation.*

	Entrance.		Height.				
	Date.	Age.	Entrance.	First annual.	Second annual.	Third annual.	Prior to graduation.
L. A. B.....	July, 1917	17 7	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{1}{8}$	65 $\frac{1}{2}$	65 $\frac{3}{8}$
J. R. B.....	Aug., 1917	17 1	64 $\frac{1}{2}$	64 $\frac{5}{8}$	65	65 $\frac{1}{2}$	65 $\frac{3}{8}$
H. A. C.....	July, 1917	18 10	65	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{3}{8}$
A. M. C.....	Aug., 1917	17 4	64 $\frac{1}{2}$	64 $\frac{7}{8}$	64 $\frac{1}{8}$	64 $\frac{7}{8}$	64 $\frac{7}{8}$
F. H. C.....	July, 1917	17 7	64	64 $\frac{3}{8}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
J. S. F.....	July, 1917	17 2	65 $\frac{3}{8}$	65 $\frac{1}{4}$	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{3}{4}$
K. R. H.....	July, 1917	18 10	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{1}{2}$
U. H. McW.....	May, 1916	18 1	65 $\frac{3}{8}$	65 $\frac{7}{8}$	66 $\frac{1}{2}$	65 $\frac{5}{8}$	65 $\frac{7}{8}$
E. C. M.....	June, 1917	19 2	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65	65	65 $\frac{3}{8}$
G. D. M.....	July, 1917	19 2	65 $\frac{3}{8}$	65 $\frac{3}{4}$	65 $\frac{3}{8}$	65 $\frac{3}{4}$	65 $\frac{7}{8}$
L. S. S.....	July, 1917	18 2	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{3}{8}$	65 $\frac{1}{2}$	65 $\frac{3}{8}$
L. A. A.....	Aug., 1916	18 10	65 $\frac{3}{4}$	65 $\frac{5}{8}$	(?)	65 $\frac{1}{4}$	65 $\frac{1}{2}$
N. A. C.....	June, 1917	17 9	64 $\frac{3}{8}$	64 $\frac{3}{8}$	64 $\frac{1}{2}$	.....	64 $\frac{3}{4}$
F. G. C.....	June, 1917	17 9	65 $\frac{1}{2}$	65 $\frac{3}{4}$	65 $\frac{1}{2}$	.....	65 $\frac{3}{4}$
C. N. C.....	July, 1917	19 4	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{3}{8}$	.....	65 $\frac{3}{8}$
A. M. G.....	July, 1917	18 5	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{7}{8}$	.....	65 $\frac{5}{8}$
J. C. H.....	July, 1917	17 5	63 $\frac{1}{2}$	63 $\frac{1}{2}$	63 $\frac{1}{2}$	.....	63 $\frac{1}{2}$
L. J. J.....	July, 1917	18	65 $\frac{1}{4}$	65 $\frac{1}{4}$	65 $\frac{1}{4}$	.....	65 $\frac{1}{8}$
B. S. J.....	June, 1915	17 8	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{2}$	65 $\frac{1}{4}$	65 $\frac{3}{8}$
M. R. K.....	July, 1917	19 5	65 $\frac{3}{8}$	65 $\frac{3}{8}$	65 $\frac{3}{8}$	.....	65 $\frac{3}{8}$
F. J. McK.....	June, 1917	19 2	65 $\frac{3}{8}$	65 $\frac{1}{4}$	65 $\frac{3}{8}$	.....	65 $\frac{1}{4}$

TABLE 4.—*Tabulated growth records of midshipmen who would have passed new entrance requirements but who failed to attain 66 inches by graduation—Con.*

	Entrance.		Height.				
	Date.	Age.	Entrance.	First annual.	Second annual.	Third annual.	Prior to graduation.
C. G. M.	July, 1917	18 2	64½	64½	64½	.....	64½
P. O. M.	June, 1917	16 5	63½	64	64½	.....	64
J. C. P.	June, 1917	18 3	65½	65½	65½	.....	65½
G. L. R.	June, 1917	16 3	64½	64½	64½	.....	64½
J. E. R.	June, 1917	17 8	64½	64½	64½	.....	64½
N. O. S.	July, 1917	19 1	65	65	65	.....	65
J. S.	June, 1917	16 8	63½	63½	(?)	.....	64
A. E. T.	July, 1917	16 5	64½	64½	65	.....	64½
R. M. W.	July, 1917	16	63½	64½	65½	.....	65½
C. W.	July, 1917	16 5	65½	65½	65½	.....	65½
L. W. M.	July, 1917	17 3	65½	65½	65½	.....	65½
B. K. C.	June, 1917	19 5	65½	65½	65½	65½	65½
K. H. P.	June, 1917	17 8	65½	65½	65½	.....	65½

These records further show that 6.35 per cent of each class would fail to attain 66 inches before graduation after passing the new entrance requirements. To insure this height it would be necessary for the permanent medical examining board at the academy to apply the new entrance requirements at each annual physical examination. This would disqualify 5.5 midshipmen (2 per cent) in each class on their fourth-year examination; 4.5 (1.7 per cent) on the third-year examination, five midshipmen (1.9 per cent) on their second-year examination, and two midshipmen (0.7 per cent) prior to graduation.

All of the 3.9 per cent who attained 66 inches by graduation would have passed each annual physical examination. However, it is considered desirable not to apply these entrance requirements at each annual physical examination because of the loss to the Government, as represented by the length of stay at the academy, and to the individual in having a prospective career aborted.

In any case below the required minimum height for enlisted men, 64 inches, it is believed that the board should reject at the physical examination for graduation. Our statistics show that 6 midshipmen in the group of 538 examined did not attain 64 inches by graduation. However, all of these men were in the group which would have been physically disqualified by the new regulations at the entrance examination.

It will be noted that some of the tabulated cases have four examinations recorded and others have five. This is due to the class of 1920 completing their course in three years. Also, slight discrepancies occur in the height records due to measurements being made by different individuals.

We wish to express our appreciative thanks to the commanding officer of the Naval Hospital, Annapolis, Md., for permission to have the X-ray examinations made, and to Lieut. E. B. Whistler (M. C.), U. S. Navy, who made the necessary roentgenograms.

Dr. J. D. Stout, of Washington, D. C., and Commander H. W. Smith (M. C.), U. S. Navy, gave many valuable suggestions. The forms for the anamnesis and examinations are largely due to Doctor Stout, who also reviewed the endocrine findings. Doctor Smith also reviewed the roentgen plates, which consisted, in addition to those referred to in the tables, of a series of chest plates taken for the purpose of determining by the degree of ossification in the costal cartilages, whether or not a marked prematurity of ossification occurred in these cases of under height.

The evidence from the chest plates was decided to be inconclusive.

CONCLUSIONS.

1. The new regulations governing the height required of candidates for the Naval Academy promise to reduce under height in officers by almost one-half, if rigidly enforced.
2. Growth is not stimulated by thyroid and pituitary therapy in individuals at or near chronological maturity.
3. Present preparations of anterior pituitary extract appear to be inert as growth stimulants in these individuals, when administered orally.
4. There is possibly an appreciable percentage of thyropeia in this country.

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SANITATION IN AMERICAN SAMOA.

By D. HUNT, Lieutenant Commander, Medical Corps, United States Navy.

The Samoan group of islands extends in latitude from $13^{\circ} 26'$ south to $14^{\circ} 22'$ south, and in longitude from $169^{\circ} 29'$ west to $172^{\circ} 48'$ west.

American Samoa comprises the "Island of Tutuila and all other islands of the Samoan group east of longitude 171° west of Greenwich."

The islands of American Samoa from east to west are: Rose Island, Tau, Olosega, Ofu, Aunuu, and Tutuila. The islands of Tau, Olosega, and Ofu are generally known as the "Manua group," and the island of Aunuu is embraced in the name "Tutuila." Rose Island is a coral atoll, uninhabited, and of practically no value.

The Samoan Islands are of volcanic formation and are mountainous. They are all extensively covered with vegetation. The soil is a rich mold, a decomposition of vegetable matter with a slight proportion of decomposed lava. Trees that are left on the ground have decomposed and entirely disappeared in from two to three years.

The climate is tropical. The southeast winds blow strongly from May until November; during the other months of the year the winds are variable, frequently from west and northwest, with occasional gales.

The rainy season extends from December to March. February shows the greatest average rainfall, 24.1 inches; August the least, 7.8 inches. The average yearly rainfall for 20 years has been 195.5 inches. The temperature is highest during the summer months, December to February. December shows the highest average temperature for 20 years, 82.4° F., and June the lowest average temperature, 79.7° F. The highest temperature is about 90° F. and the lowest is about 68° F.

The Samoans are the true Polynesians, probably the finest physical specimens of the race. Their complexion is brown, but it is difficult to name a particular shade, as they present a great variety of color. They are well formed, erect in bearing, and have flat features. The average height of the men is about 5 feet 10 inches. The Samoan does not like to work, which is probably due to his life and environment. His wants are few, as the climate demands that little be worn and as his food is easily produced.

American Samoa is divided into three general administrative divisions—Eastern District of Tutuila, Western District of Tutuila, and Manua District—these corresponding to the Samoan political divisions which have existed from early days. Each district is administered by a native district governor appointed by the governor. The districts are divided into counties, each administered by a county chief. These are also very ancient political divisions, each ruled by one high chief. The county chiefs are appointed by the governor, but the selection is limited, as the office is usually given to the chief whose name entitles him to it by Samoan custom, an hereditary position which is held during good behavior. District governors are chosen from the rank of county chief.

Each village is controlled by a village chief, "pulenuu," elected annually. The village councils are composed of the "matais" (heads of families) in each village.

The suffrage is restricted to the "matais," in accordance with the Samoan custom, whereby the family, not the individual, is the unit of society.

A monthly newspaper, "O le Fa'atonu," is the government gazette.

The most important product of the soil of Samoa is the coconut. The chief usefulness of the coconut is the copra produced from it. It is the principal, in fact the only, export from American Samoa.

There are 63 villages in American Samoa. Fifty-five of these are located on the seashore. The only point ever considered by the Samoans, prior to 1900, in choosing the location for a village was its strategical position in time of war. The average population of a village is about 150, while no village exceeds 500 inhabitants. The cook houses are either along the beach or just to the rear of the village. The plantations are located a short distance in the rear of the village.

The native houses are very skillfully made by native house carpenters. The framing is all lashed together with sennit, and the thatch, made from sugar cane, is lashed to the roof in the same manner. The floor is made of small pieces of coral which have been worn smooth on the beach. The houses are either round or elliptical. Curtains, called "polas," are arranged to let down in sections around the sides for protection against wind or rain. When visitors appear mats are unrolled and cover nearly all the floor.

For 11 years prior to the year 1900, when Samoa was ruled by a native government under the joint protectorate of Great Britain, Germany, and the United States of America, little active authority was exercised over the islands now known as American Samoa, the government of which is now within the direction and control of the United States Navy Department.

In the islands of Upolu and Savaii and the adjacent islands, now known as Western or British Samoa, the native inhabitants were fortunate in being able to receive medical advice and treatment from professional men and missionaries who had qualified to dispense medicines; but in Tutuila and the islands of Manua the natives had chiefly to rely on their own native "doctors" in case of sickness. The resident representatives of the several religious denominations rendered such aid as was within their knowledge and power to administer, but generally the Samoans had to rely on the skill and knowledge of their own people. In a number of families there were members entrusted by their predecessors with certain medicinal secrets and methods of surgical operation. For the purpose of gain these secrets were rigidly kept by the holders thereof who would only part with their knowledge upon approaching death to another member of the family.

Nothing, however, was done through any of these agencies to improve the sanitary or hygienic condition of the people and their villages.

Fortunately the Samoan people are and have been from time immemorial a cleanly race of people, and they insisted on cleanliness of the body and of their domiciles in so far as their knowledge of hygiene permitted. But certain unfavorable conditions were permitted to exist in many places which were not deemed by the Samoans as uncleanly and a menace to the health of the inhabitants; or some unsavory conditions were permitted to remain as obnoxious and detrimental to a healthy state through an aversion to refer to a nuisance committed by a member of a community or on the property of one of the owners.

It was a common practice for the people to deposit their excrement along the public thoroughfares and on the beach above high-water mark. Hogs were permitted to run among the villages; in fact, the walls known as "pig walls" were built to keep the swine in the village instead of outside, as is now the rule. Stagnant pools of water were allowed to stand and these were used as common bathing places for the people. The habit of expectorating under the mats covering the floors was indulged in without check. In fact, this is done by many at the present time. Such insanitary conditions created an unhealthy atmosphere invaded by swarms of flies and mosquitoes.

In American Samoa the people endeavored to live up to the Samoan idea of cleanliness; but the general condition of health and the general appearance of the people showed evident signs of the evil effects, due to their ignorance of the elementary laws of sanitation.

Leone, which was then the most important business town of Tutuila, presented an unsightly and uninviting appearance upon approaching the beach in a boat. The shore was lined with the

native cook houses, around which débris and leaves for "covering" the ovens were allowed to accumulate and rot. Hogs were numerous and permitted to run at large in the village within the concrete wall which was originally erected by the people of Leone for protection from attack from their enemies in time of war. The inland villages of Malaeloa, Iliili, Pavaiai, and Vailoa presented a pleasing appearance upon entering; but upon inspecting the lands planted in bananas and taro immediately to the rear of their houses an unsavory state was strongly in evidence. At several of these places there were stagnant pools of water in which the healthy and the unhealthy people all bathed. There was no chance for the polluted water to be got rid of except by evaporation, but the pollution remained. The people of Vailoa, Taputimu, Vaitogi, and Iliili had to travel long distances to get fresh water for drinking purposes. Nuuuli was an important place and the village itself was clean, but it was unpleasant to walk along the beautiful beach before the village at any time. There were no roads connecting the villages of Tutuila, which were reached by narrow trails upon which no pick or shovel or stick had ever been used. They were, as was occasionally jestingly remarked, the roads used at the time of Adam. The trails were pleasant under the thick forest, but in the open the brush and weeds were allowed to grow waist high and one could not pass in the morning or after a shower without getting the clothes saturated with water. The Samoans usually divested themselves of the simple loin cloth or lavalava and went through as if wading a stream. These trails took one over rocks which were only passable at low water, especially when the points of land between Nuuuli and Pagopago had to be crossed.

Fagatogo, which is now the United States naval station, was, prior to 1900, one of the most pestilential villages in Samoa. There appeared to be a greater proportion of diseased people in this village than in any other in Tutuila. Wherever one traveled in Tutuila and Manua the attention was immediately drawn to the painful condition of the majority of the children, who were covered with yaws, a large proportion of them affected with conjunctivitis. A number of the older people had open sores on the body which appeared to be eating away the flesh from the bones; about half of the older people had elephantiasis, and there were a few cases of leprosy. Children with yaws about the lips and face would be observed covered with flies, and the bite or sting of any of these flies would cause a visitor to strike fast and hard on the spot attacked by the insect. Yet the people seemed to be unaffected by any sting or bite of the flies. Fagatogo was in a more serious condition than any other village in Tutuila. The present parade ground or "malae" was then an unhealthy mangrove swamp, where the people went at all times to obey the calls of nature.

The few houses which then existed were along the beach and on

the inland and western sides of this malae. If one desired to depart from Fagatogo along the foreshore to Pagopago it was necessary to wait until low water to pass the point which now forms the boundary of the United States naval station at Fagatogo; then along a narrow stony trail with weeds on each side waist high, with now and again a wade through bog where the springs sent their overflow down to the seashore. Pagopago was then the chief place on the harbor, and the conditions which existed there were slightly better than in the other villages; but to travel between any of the villages around Pagopago Harbor was difficult during the daytime and dangerous at night. It was impossible without the aid of a torch or of a lantern. The town of Aua on Pagopago Harbor was in a slightly better sanitary condition, and one may make the same remark concerning all of the villages toward the east. This was due to the better natural conditions of the country and especially the water supply.

Manua was no better than other parts of Samoa, and the people were addicted to the same insanitary habits.

Since the administration of the government of American Samoa has been under the direction of the United States Navy Department the senior medical officer has had entire charge of the public health and medical treatment of the people. He has also acted as quarantine officer for American Samoa, the only port of entry being Pagopago Harbor. In 1911 he was given the title of public health officer of American Samoa. There are no civilian physicians and there is no field for them, as the native population is treated without cost and the foreign population is very small. The population has increased from 5,679 in 1900 to 8,058 in 1920, 41 per cent. All the information available leads me to believe that the Samoans were gradually decreasing in number prior to 1900. During the 22 years of American occupation, with the quarantine measures instituted by naval medical officers, only one epidemic has occurred—a mild epidemic of measles in 1911. During the recent pandemic of influenza there was not a case in American Samoa, although there was no interruption of commerce or mail, while in other islands within sight there were over 10,000 deaths.

In 1913, with the approval of the Surgeon General, the Samoan Hospital was erected. The administrative building, operating room, sterilizing room, dressing room, laboratory, and nurses' quarters were constructed by the island government, while the four native houses used as wards were constructed by the Samoan people. These native houses are kept in repair by the people, certain houses being assigned to each district. All medical and surgical equipment and supplies are secured upon requisition from the Bureau of Medicine and Surgery. The Navy personnel assigned to duty at the Samoan Hospital



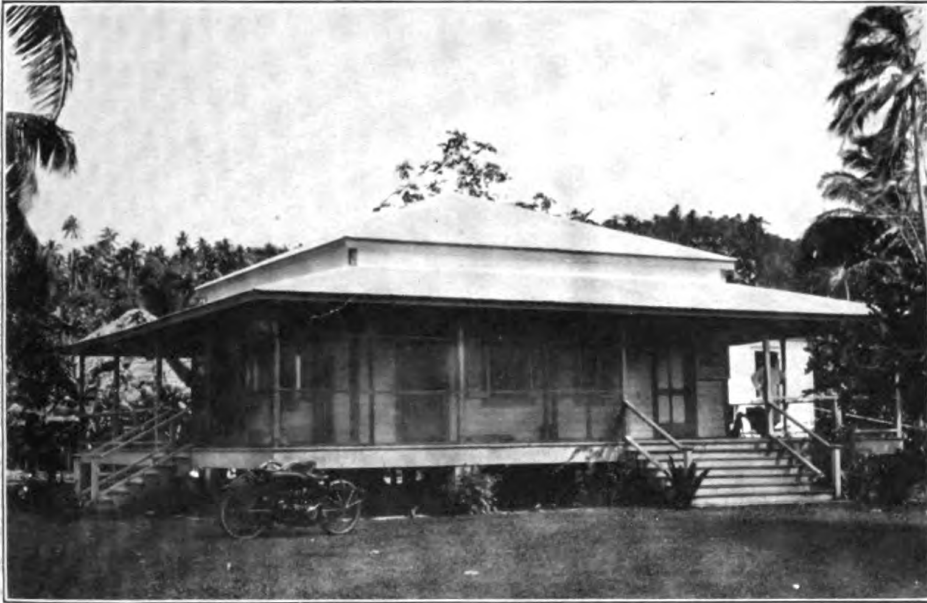
A SAMOAN VILLAGE.

442-1



PUBLIC WASHING PLACE IN A SAMOAN VILLAGE.

442-2



DISPENSARY IN THE VILLAGE OF LEONE.



PUBLIC LATRINE IN AN INLAND VILLAGE.

442-3



SAMOAN HOUSE AND KITCHEN



PUBLIC LATRINE IN A SAMOAN VILLAGE ON THE BEACH.

442-4

consists of one medical officer, four nurses, two Samoan hospital corpsmen, and one Samoan apprentice seaman for hospital corps duty. The other medical officers and the dental officer frequently assist in the work at the hospital. The hospital can accommodate about 50 patients, and usually all the beds are occupied. A medical and surgical clinic is held three times a week and a dental clinic twice a week. A dairy is run in connection with the hospital, which makes it possible not only to furnish excellent milk for the patients, but to supply all American families, who have small children, with fresh milk.

The Samoan Hospital Training School for Nurses was established in 1913. It provides a two-year course of training for young native women and the pupils are carefully selected from the graduates of the missionary schools for girls. They are not only the best educated native girls, but are able to read, write, and speak English. Each class consists of four or five girls and upon graduation the native nurses alternate duty between the hospital and as a visiting nurse. As visiting nurses they administer simple drugs, attend confinement cases, instruct mothers in the care of babies, and see that those who need treatment are sent to the hospital or the nearest dispensary. Each village is visited at least twice a month and a nurse is assigned to each of the isolated villages.

In 1915 dispensaries were erected at Leone and Tau. Leone is in the western district of Tutuila and Tau on the island of Tau, in the Manua district. During 1921 a dispensary was erected on the island of Ofu, making it possible for the people of the islands of Ofu and Olosega to receive medical attention, and within the next few months a dispensary is to be erected at Amouli, eastern district of Tutuila. In connection with each dispensary there is a native house, used as a ward, that will accommodate 12 patients. There is also a radio station and radio operator at each dispensary which makes it possible for the man in charge to inform the senior medical officer, at any time, in regard to sanitary conditions and of any medical or surgical cases of which he is not qualified to take care. A chief pharmacist's mate is assigned to each of these dispensaries and in addition to looking after the sick and holding daily sick call he is required to make weekly inspections of certain villages in the vicinity of the dispensary.

There are two chief pharmacists' mates assigned as sanitary inspectors, every village being inspected at least twice a month.

Frequent inspection trips are made by medical officers. Medical parties are frequently sent over the islands, from village to village, in eradicating endemic diseases.

Many of the customs and superstitions of the older Samoans in regard to medicines, sanitation, and hygiene can not be overcome, and if we are to rid Samoa of such practices it must be by educating the younger generation. Prior to 1921 there was only one public school, with the exception of the missionary schools, in American Samoa. During 1921, under Governor Evans's administration, there were 18 additional public schools established. These schools are located so that they are easily accessible to all Samoan children, who, according to law, are required to attend school between the ages of 6 and 13. English is taught in the public schools. Governor Pollock in July, 1922, secured an experienced American, who had several months' teaching experience in Hawaii, to take charge of the Poyer School and to make frequent inspections of the schools. All the native teachers secure their training at the Poyer School. Manual training will soon be instituted in all the schools. Cottle, in 1911, wrote a book on hygiene for use in the schools of American Samoa. This was revised by Dollard in 1920. Humphreys is now writing a physiology and hygiene for use in the public schools that will be published in the early part of 1923.

Since the first issue of the government paper, "O le Fa'atonu," frequent articles have appeared designed to improve the sanitary conditions and the health of the Samoans. Every family in American Samoa is furnished with a copy of this paper free of cost. In April, 1922, upon the recommendation of the senior medical officer the governor issued an order requiring the public health officer to prepare an article on public health matters for each issue of the government gazette. He also directed the pulenuu of each village to read these circulars, upon their receipt, to all the people of the village. The sanitary inspectors ascertain whether or not these instructions are carried out by the pulenuus.

The clothing of the Samoan consists of a "lavalava" or loin cloth, but in the case of women, a tuniclike affair, which reaches to the hips, is worn; sometimes a long, loose gown. On occasions of ceremony the men wear a shirt or coat. Around the naval station the Samoans, especially the younger generation, are adopting American clothes. This is to be regretted, especially in view of the equable temperature and high humidity, the great number of ringworm infections among those who have adopted this dress, and the rapidity with which tuberculosis is increasing.

Outside of his ordinary pursuits, the Samoan takes very little exercise. They have very few sports; in fact, the only ones in which any interest is shown are cricket, boat racing, and swimming. The "sivasiva" or native dance is a very strenuous form of exercise, yet both men and women will dance for hours without becoming unduly tired.

The Samoan bathes frequently and now has sanitary bathing places in which to bathe. Their fondness for reddish brown hair is a blessing, as the bleaching agent, lime made from the coral, also kills the vermin. Adults suffer from pyorrhoea and the only possible dental treatment is extraction. The care of the teeth is being taught in all the public schools. For any skin infection frequent baths in salt water are taken.

Since 1906 all the natives have been vaccinated against smallpox on three occasions. In 1921 the entire population was vaccinated with over 50 per cent positive results. Over 85 per cent of the natives show positive vaccination scars.

The mosquito net is universally used in Samoa, while prior to 1900 it was practically unknown. This undoubtedly has been a big factor in the decrease in the number of new cases of elephantiasis.

It is indeed fortunate that the Samoans have never used alcohol in any form. The national drink, "aca," is made from the roots of the *Piper Methysticum*. The insanitary methods used in making it and the community cup, a coconut shell, that they must drink from, is undoubtedly the cause of many infections of the gastrointestinal and respiratory tracts. It is very difficult to make the natives discard any Samoan custom; it can only be done by educating the younger generation.

The Samoan houses are undoubtedly the outcome of long experience and in many respects are well adapted to the native's needs. They are cool and provide a maximum of ventilation. The Samoan, unlike many other natives of tropical countries, spends most of the day, as well as the night, in his house. The thatched roof harbors rats, bats, and vermin. The floor, consisting of loose coral, pebbles, etc., is not ideal; yet it seems to be the most satisfactory material obtainable. Frequent circulars are issued about the dangers of expectorating on the coral floors. The mats which the natives sleep on at night or sit on during the day are rolled up and placed on rafters when not in use. Every effort is being made to have them sun these mats for an hour or so each day and it is gratifying to say that this is being readily adopted.

All of the Samoan villages, with the exception of the few inland villages, are located on sand or gravel soil. They are usually kept in a fairly sanitary condition. Frequent inspections are made and the pulenuu is held responsible for seeing that all orders are obeyed. The people are required to place all cook houses in the rear of the village, to collect and burn all leaves, rubbish, etc., to keep all bathing places clean, and to see that the latrines are kept fly proof. Health orders are issued to those whose places are not found to be in a sanitary condition, and if such conditions are not corrected by the next inspection, they are taken before the village magistrate who generally fines

them, if found guilty, from \$1 to \$25. Any case that is a menace to the welfare of the people is turned over to the secretary of native affairs. They are required to keep all pigs penned, and all pens must be located at least 250 feet away from any house. A license must be paid on all dogs or they are killed. The trails to and from all villages are kept in good condition, and it is now possible to visit the majority of the villages on the south coast of Tutuila by automobile.

Whether a Samoan has 1,000 acres or 50 square feet under cultivation, it is called a plantation. The coconut plantations, owing to the scarcity of labor, are impossible to keep clear of leaves, etc.; in fact, using all the available labor, they are not able to cut the copra from all the nuts that fall. In Western Samoa they have imported Chinese and Solomon islanders for work on the plantations. The banana plantations are usually kept in good condition. There are two kinds of taro plantations, one kind being located in the hills and the other in swampy land. The Samoan prefers the taro grown in the hills, but, owing to the extra work required in clearing the hilly land, many still remain in swampy areas. With a rainfall that exceeds an average of one-half an inch a day, these taro patches are mostly under water. This furnishes an excellent breeding place for the *Stegomyia pseudoscutellaris*, which prefers or requires water containing vegetable matter as a breeding place. O'Connor recently proved this mosquito to be a transmitter of *Filaria bancrofti* in Samoa. The Samoans are being urged to move all taro patches to the hills. Breadfruit trees are planted extensively in and around the villages. They bear three times a year, the heavy crop coming on in November or December and two short crops in April and August. The fruit practically all ripens within a short time and from the trees located outside of the villages much of the fruit drops to the ground and rots; this furnishes a breeding place for millions of flies. The increase in the number of flies at the height of the breadfruit season is quite noticeable, and the natives also look for an increase of yaws and conjunctivitis at this time.

The Samoan usually eats two meals a day, though he very seldom refuses food when offered. His diet consists chiefly of taro, breadfruit, bananas, coconut, and occasionally fish. Pigs and chickens are raised, though these are usually reserved for special occasions. Canned salmon and corned beef are considered a favorite delicacy. There are 50 Samoan dishes, of which 9 are suitable for the sick.

There are streams that flow down from the mountains through 44 villages, and as no habitation exists above any of the villages, these streams furnish excellent water for drinking and bathing purposes. Of the 23 villages that depended on seepage water in

1900, 18 now have excellent water, due to the construction of reservoirs by the island government for drinking and bathing purposes. There are still five villages that depend on seepage or rain water.

All villages are equipped with either pit or beach latrines. As far as can be ascertained, the first latrines were erected in 1911, and since that time they have been frequently renewed. In 1921 these latrines had practically all been discarded and new pit latrines were placed in all villages, each latrine having 6 seats, one latrine being furnished for each hundred persons or fraction thereof. The pit latrines have not proven to be entirely satisfactory, due to the difficulty in making the people keep them fly-proof and because not more than 50 per cent of the people will use them. The beach latrines, erected below low-water mark, have, on the contrary, proven to be very satisfactory; and practically all of the people of the villages where they are located use them. During the past year 20 villages have been equipped with beach latrines. In the few villages which, on account of the surf or being too far inland, can not have beach latrines, it is planned to construct septic tank latrines.

Rats are very common in Samoa, though they do not infest the houses to any great extent. Some years ago, when plague existed in Australia, a campaign was started to eradicate the rat by offering a reward for each tail. One district brought in over 18,000 tails within a very few months, which immediately aroused suspicion; and on investigation it was found that nearly every family in the district were raising them, the population of the district being less than 2,000. There are no snakes on the island of Tutuila. Centipedes are quite common and people are often bitten by them, though as a rule it is no more serious than a wasp sting.

All houses are infested with cockroaches and small white ants. The principal cause of transmission of two endemic diseases of Samoa, yaws and conjunctivitis, is the fly. The number of cases of conjunctivitis is practically negligible, except during the breadfruit season, when it becomes almost epidemic, and at this time the flies also appear in swarms. The recent construction of fly-proof latrines and requiring each village to make daily collection of all fallen breadfruit will tend not only to lessen the number of flies but also the number of cases of yaws and conjunctivitis. There are so few horses and cattle on the islands that the question of manure plays a minor part in the number of flies. The mosquito transmits filariasis and dengue. While filariasis exists in Samoa, yet I have failed to see a true case of dengue; many of the so-called cases of dengue being tropical fevers of unknown cause. The extermination of the mosquito in Samoa is a big problem, especially in view of the dense vegetation, excessive rainfall, lack of labor, and the Samoan traits; in fact, it is doubted if they will be lessened to any great extent for

many, many years. There are seven known species of the mosquito and probably many more, and an effort is being made to classify them.

The principal endemic diseases are yaws, conjunctivitis hookworm, filariasis, and elephantiasis, and tuberculosis.

Yaws has been practically eradicated, and, with the present laws and methods of inspection and supervision, it should always be easily kept under control.

Conjunctivitis is very prevalent and its effects are noticed in every village where you see men, women, and children afflicted with blindness, the result of Samoan medicines and practices, or applying too late for medical treatment. The causative organism is a diplococcus which morphologically resembles the gonococcus. Gonorrhea at one time, about 1796, was very prevalent, it being stated that one out of every four persons suffered from it at that time. It is possible that the organism is an attenuated form of the gonococcus. Certain experimental work is being done along these lines. A campaign to eradicate conjunctivitis is now being carried on.

Hookworm infection is extensive; 95 per cent of the people examined have shown positive findings. During the past few months over 3,000 cases have been treated.

Elephantiasis is on the decrease. Fauntleroy stated in 1907 that 50 per cent of the men and 20 per cent of the women of American Samoa had elephantiasis. At the present time not over 15 per cent of the men and 10 per cent of the women have the disease. Many lines of treatment have been tried, including ferric chloride, tartar emetic, and concentrated quinine. While none of the results have been encouraging, the intravenous injection of concentrated quinine, daily injections of 10 to 15 grains for 10 days, and this being repeated after a week's rest, have given the best results. One case treated by this method over a year ago has had no recurrence of filarial fevers or of the embryo in the blood stream, which disappeared after the first treatment. Such treatment is now being tried in incipient cases of filariasis.

Tuberculosis is on the increase, and unless immediate steps are taken to prevent its spread the Samoan race is in danger of dying out. Recommendations have been made to construct a Samoan village at an elevation of 1,000 feet or more and to send all tuberculosis individuals to this village.

Samoan medicines and practices are still believed in by probably a majority of the Samoan people.

Fairly complete records of vital statistics are now being kept. A survey of the islands is now being made in which every man, woman, and child is being inspected; and a tabulation of the diseases of American Samoa is to be made.

MALINGERING—PRETENDED BLINDNESS.¹

By JACK I. KURTZ, B. S.

Malingering is one of the most important and most difficult problems the refractionist of modern times has to meet. Very little has been written on this subject and not much of it is taught in schools or colleges giving instruction in refraction, and as a result most practitioners are at a loss when confronted with a case which may involve malingering.

The malingerer is not to be found very often amongst the ordinary run of refractionist's patients. When a person is malingering he or she has a motive behind it. He is trying to collect damages as a result of a supposed or real injury. In this modern day of the automobile and its many accidents, of life insurance with its total and partial permanent disability clauses, and of sick and accident insurances, as well as workmen's compensation laws, we are bound to find individuals who are trying to obtain compensations or insurance on the least pretext. Sometimes these persons claim greater defect or loss of eyesight than really exists in order to secure greater judgments for the injury of the eyes. Others pretend blindness in order to secure pensions, some to avoid military service, and some in order to be admitted to some charitable institution. Sometimes children pretend blindness in order to be relieved from school duties.

The refractionist of to-day should familiarize himself with the different methods of the examination of malingerers in order that, when called upon by the court or insurance company to examine a claimant, he may be able to determine whether the claimant actually has some eye defects and impaired vision, or is simply malingering and to what degree.

Malingering may be divided into three classes:

1. Total blindness in one eye.
2. Partial blindness in one eye.
3. Total or partial blindness in both eyes.

1. TOTAL BLINDNESS IN ONE EYE.

Total blindness in one eye is usually claimed by many who try to evade the military service or those who try to collect partial permanent disability on their accident or life-insurance policies or by those who become injured while employed at a place where workmen's compensation insurance is carried. To find out whether total blindness exists, many tests may be performed which will help the examiner very much. These tests may be divided into two classes:

1. Objective.
2. Subjective.

¹ Reprinted from American Journal of Physiological Optics, October, 1922.

OBJECTIVE TESTS.

Objective tests are: (a) Pupil reaction; (b) vision fixation test; (c) objective prism test; (d) static retinoscopy; (e) dynamic retinoscopy; (f) objective monocular accommodation; (g) ophthalmoscopic examination.

Pupil reaction.—If the pupil of the eye which is exposed to light contracts there is a probability of sight in that eye. To test the pupil reaction the subject under examination is directed to look forward. The examiner covers both eyes with his hands, thereby cutting the light off from the subject's eyes. The hands are quickly removed and the reaction noticed. If the pupil reacts to light there is evidence of some sight and the better the reaction the more vision there is. The degree of sight can not be measured by this test. There is, however, a positive value to this test. That is to say, if there is no contraction of the pupil to which the light is applied and there is a reaction of the pupil of that eye to which the light was not applied (i. e., consensual reaction takes place), there is evidence then that the eye is blind.

As the pupil also reacts under accommodation and convergence, it is, therefore, essential in making this test to have the subject look at a fixed distance during the period of the examination.

Vision fixation test.—When an eye is partially or totally blind it fails to maintain proper fixation. If when, under all conditions, perfect parallelism exists, there is good proof that there is some sight present. The sight may not be as good as in the other eye, but at least it is good enough to produce and maintain binocular single vision. In this test the examiner should be on his guard for cases of persons who may consciously or unconsciously disassociate accommodation from convergence and in that way suppress the image of one eye. These cases are usually strabismic and are easily detected.

Objective prism test.—A prism, 10°, base out, is placed before either eye. In binocular vision the cornea of the eye before which the prism is placed is rotated inwardly, unconsciously and involuntarily, as the false image is fused with the true image.

Static retinoscopy.—It is needless to describe in detail how to perform this test as every modern refractionist knows retinoscopy and how to use it. If the error of refraction is small there is no cause for blindness, or materially reduced vision, in so far as accommodative and refractive conditions are concerned.

Dynamic retinoscopy.—This test should be made with fixation and observation at 13 inches. If under this test the error is also low and varies but little from the static retinoscopic measurement, the claim of blindness may be considered merely as pretended.

Objective monocular test.—This test is made by placing the correction in front of the patient's eyes. Cover one eye and examine

the other. The examination is performed in the following manner: Have the patient look at an object like a pencil or finger at a distance of 13 inches. The object is to be held to the nasal side of the eye during the examination, while the retinoscopic examination is made from the temporal side as close to the visual line as possible. The test object is moved as near to the eye of the subject under observation as will still permit of its being seen. The observer with the retinoscope moves forward till he obtains a neutral shadow position. This distance is carefully measured. The same procedure is carried on in examining the other eye.

The distances obtained from the examination of each eye are compared. If there is but little difference in the distance of the neutral point, there is also little difference in the accommodation of the two eyes. The subject should be able to see as well with one eye as with the other.

This test is very simple and interesting. For more detailed explanation about this test and the theory involved, we make reference to Sheard's *Dynamic Skiametry*.

A case which will best illustrate this test is that of Mr. H., aged 24. Static retinoscopy, O. D. +1.00 D. S., O. S. +5.50 D. S. Dynamic retinoscopy, O. D. +1.75 D. S., O. S. +6.50 D. S. Subjective static tests, O. D. +1.00 D. S. $V=20/20$ O. S. +4.50 D. S. $V=20/200$ and could not be improved. The objective monocular accommodative test showed O. D. had 6 D. of accommodation, but the near point for the left eye was less than 20 inches with no improvement. In a case like this we can be satisfied that the left eye has very little visual acuity.

Ophthalmoscopic examination.—This examination is very essential, for blindness in some cases may prevail, even if there is only a low error of refraction found, as long as there is found a fundus lesion, some pathologic condition of the choroid, retina, or cloudy media.

SUBJECTIVE TESTS.

Subjective tests are: (a) Binocular reading test; (b) Duane's method; (c) prism base up and down test; (d) double prism test; (e) pinhole test; (f) 10 diopter convex lens test; (g) test with Worth amblyoscope.

Binocular bar reading test.—While the patient is reading small type on reading card at near, a pencil is held in front of the card by the examiner. The ability to read uninterruptedly proves that both eyes are functioning, as the pencil cuts off the letters and words from each eye on different places on the card and could not be read monocularly without interruption.

Duane's method.—Have the patient read aloud and quite rapidly. While occupied with what he is doing, quickly place a four-degree

prism base down in front of the alleged blind eye. The examiner should be certain that the eye is open at that time. If the eye is totally blind or vision is very poor the placing of the prism will make very little difference in the reading. He will be able to read just as well as before the prism was placed in front of the eye. But if there is some sight in that eye he will not be able to read or will at least stumble, as the placing of the prism will produce double vision.

Test with a pair of five-degree prisms.—Place one prism base up and the other base down in front of the subject's eyes. Have the patient hold a card about 4 by 6 inches with a horizontal line of large print (12 to 14 points). Ask patient if he sees four rows of print or only three. If he claims he sees two only there is good proof that there is vision in the alleged blind eye.

Double prism test.—Place a double prism in front of the good eye and an opaque disk in front of the other eye. Have the subject hold a card with a horizontal line of print on it. Ask the subject whether he sees one or two lines. If he claims he sees only one line there is proof of dishonesty. For the double prism in front of the good eye produces double vision, hence he must see two lines with the good eye. Care must, however, be taken that the prism is properly placed in front of the eye.

Pinhole test.—Place a pinhole disk in front of the good eye so that the small hole is as near the center of the pupil as possible. Have the subject read at distance or at near. His head is then to be slightly turned downward till the visual line comes above the pinhole. If the subject is still able to read he is doing so with the alleged blind eye.

Test with a 10 D. convex lens.—Place a 10 D. convex lens in front of the good eye. This eye becomes artificially myopic and will have its focus at 4 inches. Hold a reading card with fine-sized print on it in front and very close to the patient's eye. As he reads, gradually remove the card farther away till it is outside of the focus of the lens. If he is still able to read he is doing the same with the alleged blind eye.

2. PARTIAL BLINDNESS IN ONE EYE.

In partial blindness the test may be made objectively or subjectively. The objective tests have already been described under total blindness. Some subjective tests only will be mentioned here.

Subjective tests are: (a) Jackson's convex and concave cylinder test; (b) Snellen color test; (c) mirror test; (d) movable chart; (e) Kurtz's visual acuity test.

Jackson's convex and concave cylinder test.—Place a +6.00 D. C. and a -6.00 D. C. axis parallel in front of the good eye so that one

lens neutralizes the other. Have patient read on distance test chart and turn front cylinder slowly till the axis of one cylinder is perpendicular to that of the other cylinder. If the patient is still able to read he is doing so with the poor eye.

Snellen color test.—This test is performed by using a chart made up of a series of transparent Snellen letters, alternately red and green, in a frame. A red lens of such a shade as to entirely quench the green letters and a green lens of such a shade as to entirely quench the red letters is placed in the trial frame. The chart of the transparent letters is to be hung on a window with plenty of illumination. Then, for instance, if the patient claims his left eye to be the poor eye and the red lens is placed in front of the right eye he should be able to read the red letters only and the green letters will appear to him black and not distinguishable. If, however, he can also read the green letters he sees those with the alleged poor eye. The acuity of vision can be measured by the size of letters he reads on that chart.

The principle of this test lies in the fact that while rays of a similar color may pass through a colored glass, rays of a complimentary color are stopped. This test is very valuable and easily and quickly performed, but care must be taken that colored lenses are of such a shade as to completely quench the complimentary colors of the transparent letters.

Special test card.—Instead of commencing with the single top line of 20/200 letter, the test chart should commence with the 20/70 or 20/50 letter. Many recruits and claimants for disability or accident insurance who have some defect or injury in one eye try to exaggerate and are fully determined to read only the first letter on the chart. This chart then eliminates this class of exaggerators, as nearly all of them read the first letter without difficulty, which is, as the case may be, 20/70 or 20/50.

Mirror test.—A mirror is placed on the wall alongside of the test chart. A similar chart with letters reversed is placed above the head of the patient. He reads a certain line on the regular chart and then is directed to read the same line in the mirror. By so doing his vision is shown to be twice the amount that the subject claims it to be.

Movable chart.—The purpose of this is to expose only one line of letters at one time. This eliminates the chance for comparison, as the claimant can see only one line at a time and can not exactly judge what size of letters he is reading.

Kurtz's visual-acuity test.—This test is performed by using a set of white wooden cubes and a set of white wooden balls, made up exactly of the same size as the letters on the test chart (i. e. there is one cube and one ball in the set for every line of letters there is on the test chart from 20/200 to 20/20 inclusive). One ball and one cube are placed at 20 feet distance on a black background 12 inches apart.

The subject is asked: Which is the ball and which is the cube? The smallest set in which he can distinguish the difference between the ball and cube measures his vision.

It is not sufficient that he sees where the objects are located, for this would simply indicate that he has the perception of a white object at a certain distance, but he must be able to distinguish between the ball and the cube. In this way the acuity of vision is measured the same as by reading the letters of the same size on the test chart.

This test has proved itself to be of great value where others have failed. No matter how the claimant may be coached on the test chart he can not outwit the examiner, as he has no means of comparing the size of the test objects with any line of test letters. An illustrative case may best explain how this test is employed.

Recruit L., age 24, white. On the record from previous examinations he had O. D. 20/200 O. S., 20/100. Refractive error was very small. He claimed at the examination that lenses did not in the least improve his vision. Fundus was normal and media clear. There was no cause for poor vision, but we did not have the proof that he could see better than he claimed. We then used the Kurtz visual acuity test and by interchanging and mixing up the cubes and balls it was found that the recruit could tell the difference between the 20/30 ball and cube. This was established as being correct by a number of trials. We then placed a +0.12 D. S. in front of his eyes and told him that with these glasses his eyes had been made perfectly normal and that he must be able to read on the test chart the 20/30 line. Failing to do so would mean that he would have to suffer the penalty for malingering. He responded quickly and read the 20/30 line on the test chart without missing even one letter.

The placing of a low power spherical lens in front of recruit's eyes is merely psychological and has a double purpose. First, by telling him that with this lens his eye is made perfectly normal and he must be able to read a certain line on the test chart, he is indirectly told that the examiner knows the exact condition of his eyes, and he would therefore be afraid to continue stalling. Second, it is much easier for a subject with a lens in front of his eye to read a certain line on the test chart, which he previously under no circumstances could read with his naked eye. He feels that he is now reading something he claimed he could not see before, but he is doing it under different conditions, for he is doing it with a supposed lens correction in front of his eye.

This test is also valuable for illiterates and young children. No hard and fast rule can be laid down as to which test to use in each case. It all depends on the subject and the examiner. The necessity of the examiner being on the alert can not be overemphasized.

An alert examiner with all these tests at his command will not have any difficulty in discovering a malingerer, no matter how well trained he may be in the art of deception.

Another interesting case may be cited. A recruit, upon examination, claimed to be entirely blind in the right eye since birth. There were two captains and one lieutenant in charge of the eye examining department at that time. They were all convinced that the recruit was stalling, but they could not prove that to their own satisfaction. The writer happened to come in to the examining room at that time and they turned the case over to him and asked him to try to prove whether or not the man was malingering. After making a few tests which were not successful we succeeded finally by using a weak convex lens in front of the left eye and an opaque disk in the front of the right eye and making the patient believe that the left eye was the one that was covered. He was then told to walk across the room. This he claimed he could not do, as he could not see the light with the right eye. This, of course, proved that he was malingering, because it was his right eye that was covered up with the opaque disk and the left—the seeing eye—was uncovered. The manipulation and changing of the lenses and disk had to be done quickly in order to get the subject so confused that he could not tell which eye he was using.

Test with the Worth amblyoscope.—This test has been used at times with great effect. Especially is this test very useful when you have to prove to a jury that the claimant is malingering. From the tests already mentioned the examiner can find out for himself whether the claimant is malingering or not. These tests are more or less technical. By properly using the Worth amblyoscope the examiner is able to not only detect malingerers for himself but can also prove it to others. To make this test the amblyoscope should be so arranged that the images are crossed when looking through it with normal eyes. The amblyoscope should be placed on the table in such a manner that the patient shall see clearly that the tubes do not cross. Now, let us take two objects, say a bird and an arrow. The bird will be placed in the tube which will be seen by the right eye (the blind eye) and the arrow, which is larger than the bird, be placed in the tube seen by the left (the seeing) eye. It should be remembered that the amblyoscope is so arranged as to have the images crossed, so that the arrow will be on the right though seen by the left eye and the bird on the left though seen by the right eye. If the claimant is malingering he will claim to see only that object on the side of the seeing eye, in this case the bird, which in reality is seen with the eye claimed to be blind. This is conclusive proof that the claimant not only is malingering, but also has good sight in the right eye.

3. TOTAL AND PARTIAL BLINDNESS IN BOTH EYES.

Simulated total blindness in both eyes is unusual because it is difficult to carry out. This may sometimes be pretended by persons who have amblyopia in both eyes or by hysterical persons.

A really totally blind person has definite and peculiar characteristics. He has a dull stare, eyes are turned upward and slightly outward, has an expressionless face, and walks hesitatingly. The objective tests are the same as for any other form of malingering. There are a few subjective tests for these cases.

The examiner may pretend that he is testing the sense of direction. The examiner may go to one end of the room and ask the patient to approach him. A piece of furniture may be placed in his way and the examiner should observe whether or not the patient is trying to avoid the objects placed in his way. Care, however, must be taken that the patient should not get injured.

Schmidt-Rimpler suggests that the patient be told to look at his own hands which he holds a short distance from his eyes. If he looks in a different direction he is only a pretender and believes that he is in this way deceiving the examiner. A blind person can easily succeed in casting his eyes in the direction of his hands.

Priestly-Smith suggests the application of the Van Waltz test. The patient is placed in a semidarkened room; a candlelight is to be placed in front of him so that he will naturally cast his eyes in the direction of the candle without being instructed to do so. A prism, base in, is placed in front of one eye. If vision exists the eye will move outward and again inward when the prism is removed.

It is not necessary to perform all the tests mentioned in order to examine a malingerer. The examiner will find that with some of these tests it will be very difficult for the most expert malingerer to deceive him, and in some cases it will take a great deal of cleverness, alertness, and knowledge on the part of the examiner to outwit the malingerer who may be well informed and trained in the art of deception.

DIAGNOSIS AND TREATMENT OF SYPHILIS.¹

By W. H. CONNOR, Lieutenant Commander, Medical Corps, United States Navy.

The subject of syphilis is so broad and the literature so voluminous that I can only touch here and there, trusting that I may be able to refresh your impressions as to the methods of diagnosis and express some ideas as to the plan of treatment.

Syphilis is an infectious disease of extraordinary chronicity attacking any and at times all organs of the body and manifesting

¹ Read before the bimonthly conference at the U. S. Naval Hospital, San Diego, Calif., Oct. 19, 1922.

itself in diverse ways. The damage that has been done to the human race by syphilis can not be estimated, as it is only during the past 15 years that the disease has been recognized in its true light and many conditions that at that time were considered specific entities are now known to be but syphilis clothed in unusual garments.

Spirochaeta pallida, the specific organism of lues, was demonstrated and so named by Schaudinn in 1905. *Treponema pallidum* was considered the better name, but it would seem that *Spirochaeta pallida* will become the accepted term, as treponema among the best writers is falling into the discard.

Our knowledge of syphilis was greatly heightened by the finding of the organism in 1905, but it advanced by leaps and bounds, following the development of the complement fixation test as applied to lues by Wassermann in 1907. Using this test it is possible to diagnosis syphilis in all its phases in about 95 per cent of the cases. In 1911 Noguchi developed luetin, and again our means of detecting syphilis was augmented so that at present it is possible to diagnosis syphilis in well over 95 per cent of the cases by using these three factors.

With such means available, we neglect in a large measure the symptomatology and signs upon which the old clinicians based their diagnosis, and to-day a diagnosis of syphilis could hardly be accepted, no matter how characteristic the signs, without the aid of a properly conducted laboratory. With a disease that will always give one of these (three) signs, it behooves us to know the interpretations and applications of the methods.

The succession of lesions that usually occur in syphilis have been grouped into the primary, secondary, tertiary, and meta or para syphilitic stage. An attempt to classify the late sclerotic changes as quarternary has been suggested, but has not received unqualified support. The signs and symptoms of the primary and secondary periods are well known, but there is such a multiplicity of symptoms in the parasyphilitic conditions that it would be useless to even attempt to enumerate them. In parasyphilitic conditions, however, a careful examination of the eye and its reflexes furnish us with the greatest single amount of information, for even a slight irregularity of the pupil should at once attract our attention, directing us toward a luetic origin.

Since no diagnosis can be complete without a laboratory confirmation, it is imperative to know what each one signifies. To understand the laboratory finding in these different phases it is probably better to disregard the three or four stages and consider lues as a disease in which the infecting organism remains at the site of inoculation (chancre) for a varying period, then spreads throughout the whole system, and in its final period localizing permanently in some organ.

The first and second periods usually do no permanent injury to the individual, but it is the final condition, neuro, vascular, or gumatous, that causes so much invalidism. Some observers believe that there are different strains of spirochaetae, one attacking the vascular system, another the nervous system, and so on, and this explanation seems quite possible. We should remember that these so-called tertiary and parasymphilitic conditions may at any time become active and the patient, without a fresh inoculation, may again pass through the bacteremic state, with its mucous patches, etc. Because of this an individual should not be considered to have the disease a second time unless he has a negative Wassermann over a long period without treatment and that the spirochaetae must be obtained from a second chancre, not from a mucous patch, even if the mucous patch is on the mucous membrane of the penis.

The most important point in lues is the finding of the *Spirochaeta pallida*, for that only can mean syphilis. They can be found throughout the disease either by dark field examination, by staining the secretions, or in stained section. There should be no failure to find the organism in an untreated primary lesion, and in treated cases it may be possible to demonstrate the organism either by hypodermic puncture of the suspected lesion or in the proximal glands. The proximal gland has not been a successful field with me, and a better method would be the removal and section of the gland.

Second in importance is the complement fixation test. As it requires a certain period following infection by the organism for the body to develop a protective agent, or antibodies, before a complement fixation test is of value, so in lues we find that the Wassermann reaction is not a valuable sign until the advent of the period of spirochetosis. At times a positive Wassermann reaction is obtained in what we call the primary stage, but who knows when the primary stage actually ends and the secondary stage begins? Sometimes a complement fixation test may be hastened by a small dose of salvasan (provocative).

In untreated cases using cholesterinized antigen a positive reaction will be obtained in from 92 to 100 per cent of incidences. Boas and Kolmer report that they have never had a negative reaction in the stage of spirochetosis. In cases having had some treatment in the secondary stage, Boas reports 97.6 per cent positive and in active tertiary syphilis 75 per cent. The Wassermann reaction remains positive so long as the spirochaetae show any activity and a dead spirochaeta will, practically speaking, not give a positive Wassermann while a sleeping one may or may not. Hence the value of making repeated Wassermann examinations following the cessation of treatment in order to be sure that the organism is actually dead, not hibernating. There are certain conditions other than syphilis

in which we may obtain a positive Wassermann, namely, yaws, tubercular leprosy, jaundice from any cause, and many acute febrile conditions. In the latter group malaria is probably the greatest offender, but only in a very small number of cases.

These exceptions while impairing somewhat the specificity of the reaction should not give us much concern. A positive spinal Wassermann is more indicative of syphilis than a positive blood Wassermann. The Wassermann therefore serves a twofold purpose: (1) As an invaluable aid in diagnosis and (2) as a guide in treatment.

Here it may be well to consider the spinal fluid findings as affected by syphilis. There are several laboratory findings which we consider as indicative of syphilis of the nervous system, namely, increased pressure and cell count, increased globulin, a positive Wassermann reaction, and Lange's collodidal gold test.

The first three, increased pressure, cell count, and increased globulin, mean the presence of some organic disorder, syphilitic or non-syphilitic, by a positive Wassermann can mean syphilis only. The collodidal gold reaction gives us information as to the kind of parasymphilis we are dealing with. In the case of paresis this reaction is specific. It should be remembered that increased pressure, cell count, and globulin may precede by many months the presence of a positive Wassermann.

When does the spirochaeta invade the spinal system and, granted that in at least 20 per cent of the cases it does so, when should an examination of the spinal fluid be made? It is not definitely known when the spirochaetae invade the cerebrospinal system, but it is probable that the nervous system is invaded during the period of early spirochetosis, and this would undoubtedly be so in case a neuro strain of spirochaetes exist. During the generalization the spirachaeta would be implanted and the seed of future trouble would begin to develop.

If such is the cycle, then a spinal puncture with examination of the cerebrospinal fluid should be made at the termination of the systemic invasion period even if the patient is symptomless and the Wassermann, which is only a symptom, is negative. If the blood is negative and the spinal fluid shows no organic disturbance at this time and proper treatment is continued, there will probably be no invasion of the cerebrospinal system. However, until our information is more exact, before a case is discharged as cured, a spinal puncture with appropriate laboratory tests should be done, remembering that signs of organic disease precede the advent of a positive Wassermann. A spinal examination should be made in every case that has at any time had a positive Wassermann and in every case before being discharged as cured.

As to the anaphylactic syphilitic reaction produced by luetin. Kolmer states that its chief value is in the diagnosis of those occasional cases of latent tertiary and congenital lues that fail to react with the Wassermann reaction and that he is convinced that in a majority of cases a Wasserman reaction carefully and skillfully performed and especially with antigen reinforced with cholesterin is stronger evidence of the absence of syphilis than is a leutin test, but that, on the other hand, a definitely positive luetin reaction may be regarded as an indication that the patient is or has been syphilitic even though the Wassermann is negative.

In considering the treatment of syphilis we have two definite objects: First, to clear up any symptoms referable to the disease, and, second, to clear up the laboratory evidence of the spirochaetae either in the blood or in the spinal fluid. To do this we have at present two dependable drugs for the eradication of the disease, one arsenic and the other mercury; the former is a spirochaetocide and the latter a stimulator of an immunity mechanism that destroys the spirochaeta. A bismuth preparation for intravenous use is being experimented with and according to preliminary reports is more powerful and less toxic than the arsenical preparation. In using the arsenical preparation we must watch and guard the vascular system and liver; in mercury we should watch for signs of kidney irritation; the appearance of casts in the urine will probably be the first sign to attract our attention and will usually precede the salivation and diarrhea, upon which we have heretofore to a large extent depended.

With these facts in mind it would seem that if the heart, liver, and kidneys can stand the constant bombardment of the two sovereign remedies, we should be able to cure syphilis. As a matter of fact, we do cure a great many syphilitics, but our recoveries can be greatly increased if we take the trouble to diagnose the cases early and follow them up with the proper treatment. It is said that if a diagnosis is made within 37 days of the infection and treatment instituted the patient will never show a positive Wassermann. How much treatment should be given in these cases will take years to determine, but it is probable that eight injections of an arsenical preparation given at weekly intervals will suffice. This treatment should be fortified with appropriate doses of mercury either by injection or intramuscularly. The proper dose of the arsenicals and mercury will be that amount that the patient can tolerate and must be determined in each case. If the amount of arsenical is below that which would usually be given in eight doses, an increased number of treatments is advisable. In cases having a positive Wassermann before treatment, the arsenicals must be given over a longer period. The number of injections will depend upon the clearing of the symptoms (Wassermann) and then more. The presence of a

negative Wassermann is only a milestone safely passed and should encourage and stimulate both the patient and the physician to persevere, for the end of the journey is in sight. Dealing with the type of individuals that are found in the naval service, it would probably be better to bombard the system continuously week after week with the arsenicals until we have gained the desired end, remembering that one or two negative blood Wassermans is not the goal.

In those cases of maltreatment and in those cases of long standing which will show a positive Wassermann, the patient's organs will probably not withstand the necessary bombardment to produce the required end, and if they are symptomless we should not break an immunity that they have developed by overtreatment, as it is possible for the Wassermann to become so fixed that treatment will not change the reaction. I remember in 1912 giving a man, who apparently had syphilis for 20 years, 12 intravenous injections of 606 at intervals of one week and 6/5 of a grain of mercury salicylate intramuscularly weekly without any effect upon his Wassermann. As he had no frank syphilitic symptoms I doubt if I helped him very much.

For those cases showing cerebrospinal syphilis in varying stages, intraspinal treatment, the use of the Swift-Ellis technique or one that seems more reasonable, the addition of a definite amount of salversan to the patient's spinal fluid and reinjecting the same into the spinal canal is advised. In the latter case we know exactly the amount of salversan he is receiving. In paretics this treatment is of no avail, but in tabes and cerebral syphilis if the sclerotic changes have not gone too far, improvement or the staying of the disease can be expected. At the present time there are two patients undergoing intraspinal treatment, and in each case the blood Wassermann was negative while the spinal fluid was before treatment 4 plus in all dilutions. In each case the cerebro-spinal fluid shows great improvement and this after three treatments in one case and four in the other.

Our greatest hope for the future in syphilis is in early diagnosis, followed by appropriate treatment. Every medical officer should know how to use the dark field to advantage, and his corpsman should be indoctrinated with the fact that every genital lesion is potentially syphilis and that no other treatment other than a salt-solution dressing is to be applied until a medical officer has been consulted.

All hospital corpsmen realize that catharsis is not indicated in abdominal pain. Why should they not be indoctrinated with the idea that antiseptic treatment is not the first treatment for genital lesions? I believe that in the service, if it is impossible to make a diagnosis early by dark field, a section should be snipped and sent

to the naval medical school for diagnosis. While awaiting the report the desirability of instituting arsenical treatment can be explained to the patient and he will probably acquiesce. A definite diagnosis would not be made until a report from the school or from a reliable laboratory had been received. In this way very valuable time for patient and service would be saved. With early diagnosis and early adequate treatment neuro, vascular, and gumatous syphilis should be much less frequent.

SOME MEDICAL AND OTHER ASPECTS OF THE EARTHQUAKE AND TIDAL WAVE IN CHILE, NOVEMBER, 1922.

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The great Chilean earthquake and tidal wave of November, 1922, in which almost a thousand persons lost their lives, excited the sympathy of our Government and medical relief was dispatched as soon as the gravity of the situation was appreciated. It was our good fortune to form part of the medical unit of the relief force and we wish to present a brief description of a rather unusual experience.

We arrived at the scene of the disaster about 12 days after its occurrence. The catastrophe had been so overwhelming that scarcely any medical relief work had been done in the area to which we were assigned. The character of the surgical problems one encounters after a happening of this kind is, of course, not of a spectacular nature. We found that the common surgical conditions—fractures, dislocations, infected wounds, and shock—constituted the majority of cases. The relief work never became tiresome because of the great need and distress of the injured.

Our activities were limited almost entirely to the valley of the Huasco River. The town of Freirina is the capital of this area. Huasco and Huasco Bajo are also towns of some importance in the same valley and are not far distant from Freirina. A hospital in the latter city was made the center of medical activities. This institution is one of 30 beds, containing a male and female ward, drug room, and operating room. The hospital was immediately equipped with naval medical and surgical stores and then attention was directed to the care of patients.

It is almost needless to remark that after so long a period without professional attention most of the wounds had become infected. A few cases of beginning faulty union following fracture were observed. One case, that of a girl of 12, required operative measures to correct malposition of the femur. Reduction of a dislocation of the hip, upward and backward upon the dorsum of the ilium, because of the length of time that had elapsed before coming under treatment, was affected only with great difficulty.

One case of dry gangrene of the left foot and lower half of the leg required amputation. The patient was an old man past 65, who died two days following operation. Many cases of simple shock required treatment. This condition was usually coupled with and prolonged by neglect and lack of food.

A case of traumatic hysteria in a boy of 8 was of considerable interest. He had not spoken or moved for 15 days. The physical examination showed no evidence of head or spinal injury. The extremities were normal. There was extreme emaciation, but his facial expression was one of alertness. Upon receiving food and attention, he was, after considerable effort, made to walk and has subsequently gained steadily. An infected hematoma of the scalp with secondary hemorrhage in a young girl, found abandoned in a house on the outskirts of the town and brought to the hospital, proved to be most stubborn and difficult to handle. The hemorrhage was controlled only after great difficulty and after considerable loss of blood.

We were impressed with the rarity of gas bacillus and streptococcus infection. Tetanus was not encountered, despite the fact that many of the injured were caught under fallen walls that consisted chiefly of mud and straw.

The horror of the disaster was certain to leave its mark on the people of the afflicted area and we saw daily many cases of hysteria. Other patients presented a symptom complex, in which great fear proved to be the most important factor.

After giving attention to the surgical problems and serious medical cases we found an opportunity to observe a large number of people from a hygienic standpoint. The rural districts and small towns of Chile do not boast of many physicians. Sanitation is not a practiced art and personal hygiene is almost unknown. Oral spesis is extremely common, and this circumstance was reflected in the large number of patients with arthritis or cardiac disability who came to us for treatment.

A lack of personal cleanliness was revealed by the many instances of parasitic skin disease. Undernourishment in both adults and children was very common and made the treatment of most conditions a difficult matter. The absence of advanced ideas relative to fresh air and the value of sunshine showed itself in numerous ways. Hookworm infection is an important factor tending to undermine the general health of the children and predisposing them to more serious diseases.

Child welfare is unknown in this region. Babies are still reared in a primitive manner and this fact is reflected in the high death rate which prevails. It is estimated that only 2 out of 10 infants

of the peasant class survive. Infantile diarrheas, due for the most part to faulty feeding, constitute the chief complaint among babies.

Were it not for the fact that the Indians and Mestizos are a very prolific people the race would die out. Even after reaching maturity the *roto* (peasant) has a hard time of it. A very old man is rarely seen.

Venereal diseases are very common and their treatment is sadly neglected. Typhus fever made its appearance in the afflicted areas, but at the time of our departure had not gained much headway.

One can scarcely imagine a less attractive spot than the town of Huasco, where during the time of our visit the sole topic of conversation was the *maremoto*—the tidal wave. It was the general belief that there had been three tidal waves in quick succession. The impressions of the people seemed to vary in regard to the height of the waves, the most common belief being that they averaged 30 feet. Several barges, high and dry a few miles inland, and other craft scattered along the shore testified to the powerful force of the disturbance. One was reminded of the fate of the U. S. S. *Wateree*, when, in 1868, it was lifted from its anchorage in the port of Arica and carried inland for a distance of 1 mile. To-day the residents of Arica tie their horses to her booms.

The very night of our arrival we experienced the thrill of an earthquake, the *terremoto*. Shocks of varying severity occurred throughout the night and the following day. These usually did no damage except to complete here and there the destruction caused by the first and greatest shock. At times the earth movement was scarcely perceptible. The sound of a shock, a *temblor* in Spanish, can be likened to that made by a heavy motor car crossing a wooden bridge.

The town is located between bleak desolate hills and the rocky shore. Far in the interior the giant Cordilleras of the Andes form a majestic background. It is not until one leaves the coast and enters the valley of the Huasco that the beauty and attractiveness of the country is apparent.

This valley, about 20 miles long, is traversed by a small but extremely picturesque river. As one drives over the road which runs along the mountainside, several hundred feet above the river, the scene that meets the gaze is very impressive. Green fields cover the floor of the valley. Even on the giant hills which form its sides cattle may be seen grazing in green pastures irrigated by canals built centuries ago by the Incas. In the distance the snow-capped summits of the Cordilleras are always in sight.

A terrible disaster has marred the natural beauty of the country. Now the stone fences are leveled, enormous crevices, newly made, parallel the roadway, houses are only heaps of ruins, and tents or improvised huts of light metal or straw dot the landscape. As one

proceeds inland the signs of destruction and ruin become greater. Villages and towns are a mass of *débris*. Men here and there are engaged in making a passageway for vehicles through the ruins of fallen buildings. All business and communication has been interrupted.

The inhabitants of this area consist chiefly of sturdy peasants of half-Indian blood. Here and there a European or an American might be seen, but for the most part the population belong to the hard-working peasant class. As one passes through the towns and hamlets an impression of hopelessness and despair is gained. The inhabitants gaze at one with an expression quite friendly, yet somewhat skeptical. It seems to an observer that they still retain some of the wariness inculcated hundreds of years ago by the Conquistadores. But they are sincere in their gratitude for the assistance which has been rendered them.

In their simplicity these people are charming. The leading residents of the larger towns are often cultured men. Several were met who had been educated in Europe or North America. Superstition still prevails in this region. In the town of Freirina, where the church was one of a few structures not greatly damaged, the inhabitants never tired of citing this incident as being the work of Providence.

There is a profound religious feeling noticeable among the women of the peasantry. The men, especially those of the upper class, are quite indifferent to all forms of Christian worship, and the intellectual life and the ethical standards of conduct are seemingly separated from religious influences. There is no hostility toward Christianity, but such things are left to women.

The physician naturally wonders what is the attitude of such a people toward everyday problems and especially their attitude on questions of hygiene, public health, and communicable diseases. Outside of the cities, which are quite modern and progressive, the attitude of the mass of people is one of indifference; it is of the old fatalistic order.

EDITORIAL.

CONCERNING FLAT FEET.

In the annual report of the Surgeon General of the Navy for the fiscal year 1921 it will be noted that although 6,839 men were prevented from enlisting because of flat foot, 643 were under treatment for disability resulting from this condition. Of these 232 were returned to duty and 400 were discharged from the service by reason of the physical disability resulting from the defect. Flat feet, during the period covered by this report, resulted in 18,946 sick days. These figures readily show how important flat foot is from a service standpoint.

The main factor in the prevention of the appearance of flat feet in the Navy is, of course, watchfulness on the part of the medical examiner in the recruiting office, but in spite of conscientious endeavor on his part some border-line case will slip by and appear at the training stations.

In thinking of the practical management of cases of flat foot, weak foot, or of foot strain which present themselves to the naval medical officer, three questions present themselves: First, what should we consider a satisfactory foot from a service point of view? Second, what are the causes of the disability? Third, what is the most practical method of treating these cases under navy conditions?

In considering the first question it may be stated that apparently not much importance is attached nowadays by the orthopedic surgeon to the height of the longitudinal arch, and the Feiss measurement and the height of the lower border of the scaphoid tubercle above the floor have not the significance they formerly had. Crandon (United States Naval Medical Bulletin, January, 1919), having in mind the foot bordering on abnormality seen in the recruiting office, came to the conclusion that if a man can balance with any degree of steadiness on one foot held straight forward with the other foot curled around the ankle, he might safely be accepted for enlistment, as men accepted by this standard with graded training up to the maximum use of the feet are less likely to be invalided by foot trouble than those taken by inspection alone. In order to pass this test successfully, of course, the musculature of the lower extremity must be in good condition. If a weakness exists allowing any degree of pronation of the foot the candidate's balance will be deranged.

Leaving aside the question of anatomy, it appears that from a service viewpoint a foot may be considered normal if there is unrestricted motion of the foot joints and the line of weight bearing passes over the second toe. According to Mebane (Military Surgeon, October, 1920), men accepted for the service on this basis during the war had little foot trouble, and if trouble did develop it responded to treatment in the great majority of cases. Men accepted in violation of these requirements, such as cases of flaccid flat feet with abduction and eversion, rigid or spastic flat feet, rigid arthritic or post-traumatic feet, marked cavus, ankle valgus or varus following fracture, marked hallux valgus, hallux rigidus and amputations or severe derangements of the joints of the great toe could only in a few instances be made fit for duty.

According to Meisenbach (Am. Jour. Orthop. Surg., 1916, p. 206) and others, flat feet fall into two classes:

1. Flexible flat feet (functional).

This type is characterized by a low longitudinal arch, pronation or weakness of the ankle, and a general atonic condition of the muscles of the leg and foot, the toes usually being straight. There is pain over the metatarsals in the weight-bearing position.

2. Rigid flat feet.

This condition is characterized by thickening of the metatarso-phalangeal ligaments; apparent shortening of the flexor tendons of the second, third, and fourth toes; erosion or thickening of the cartilaginous articular surface of the tarsal bones; the presence of deep-seated callouses on the under surface of the foot.

The causes of flexible flat foot:

1. Local.

(a) Poor shoes.

(b) Genu valgum and such other conditions as produce toeing out. The latter forces the body weight obliquely in the arch of the foot, producing an inward cross-strain. The position of the leg in which the toe falls outside of the line of progression shortens the stride, lessens the important element of thrust of the great toe, and diminishes the force of propulsion. Toeing out produces:

(1) External rotation of legs.

(2) Twisting of knees and straining of joints.

(3) Outward rotation of femur.

(4) Forward displacement of hips and shoulders. Thereby increasing the lower thoracic curve and producing a stoop-shoulder position.

2. Constitutional.

(a) *Congenital*.—Short tendo Achilles, which diminishes the flexion of the foot in walking and causes weakening of the dorsal

structures of pronation of the foot and abduction of the toe does not compensate.

(b) Neurotic.

(c) Infectious, local in tonsils, teeth, and general as syphilis or chronic gonorrhoea.

(d) Toxic or metabolic conditions resulting from altered physiologic processes with the production of an overstrain in the lower extremities as obesity.

(e) Traumatic.

NOTE.—Occupation, unless accompanied by other conditions, is rarely responsible for flat feet. (Merrill, W. J., Surg. Gyn. and Obstet., 1916, p. 336.)

Sooner or later in all cases of flexible flat foot there occurs a spasmodic irritability of the muscles supporting the arch. This spasm is caused by congestion and injection of the small tarsal articulations, caused by abnormal pressure induced by the development of extreme pronation, which in turn is induced by slacking off in the muscle tone of the groups controlling the arch. Inasmuch as the posterior tibial group of muscles is weaker than the peroneals, the spasm of the peroneals reflexly induced by this tarsal irritability tends to pull the foot over into a position of extreme eversion. If this extreme rigid pronation is permitted to continue, and particularly if the patient keeps about on his feet, adhesions will form, and, later still, erosions of the cartilage covering the articular surfaces of the tarsal bones may occur which render the feet permanently rigid. (Painter, U. S. Naval Medical Bulletin, July, 1920.)

According to Painter, the impression so prevalent that the arch of the foot actually sinks under strain is based upon the appearance of the foot when weight is thrown upon it, in consequence of which the foot rotates outward on its long axis, or pronates in the anatomical sense. The arch is no lower than ever, but because of this rotation the inner border of the foot appears to be lower than normal, but can be easily restored manually, unless the condition has persisted so long that rigidity has developed.

Speaking of diagnosis, Painter says: "The functional and symptomatic tests are the only ones which are applicable. Complicated measurements and the use of tracings on smoked paper, or observation of the area of sole in contact with a glass plate viewed through a reflecting mirror, are all equally futile in furnishing information of any value upon which to base a diagnosis of flat foot."

Considering this phase of the subject, Holcomb, writing in the United States Naval Medical Bulletin for July, 1913, calls attention to the fact that voluntary adduction or inversion of the foot is the most important test of all motions to show weakness of the foot. He recommends the following procedure: Extend the leg, keeping the crest of the tibia fixed in the median line of the limb, then have the

patient turn the foot inward as far as possible without rotating the leg. Normal adduction is about 30° from the median line. According to Whitman "even mild and early cases of weak foot usually show some limitation of this most important motion, and in many instances it is completely lost, the patient turning the entire limb in the effort to adduct the foot."

The symptomatology of flat or weak foot depends upon the degree of involvement with the production of pain and the objective phenomena resulting from toeing out. Early in the disability the patient notes a tendency to a tired, strained feeling in the calf muscles which is soon followed by discomfort, amounting later on to real pain in the tarsus, usually referred to the inner malleolus and the scaphoid region, but later on to the outer side of the ankle, in front of and below the external malleolus. Coincident with this pain there is sometimes pain in the plantar fascia on pressure and a knotting up of this fascia or the muscles associated with it. Later the calf muscles become painful and this pain is often referred to the knees and occasionally to the muscles of the thighs and even to the lower back. Congestion and sweating are common phenomena. Tenderness to pressure over the points of attachment to those facial bands whose duty it is to hold the tarsal bones together is the rule.

The sweating and congestion of the feet indicate that there is a disturbance of circulation, probably due to the muscles of the leg not acting in their capacity of auxiliaries to the heart in sending the blood on its return course. If these muscles are stretched and are not giving their normal contractile impetus, then it is easy to see that the part they normally play in assisting the circulation of the blood would be interfered with. The hyperhydrosis is probably dependent upon the circulatory disturbance.

The next stage in the progress of the disability presents a spasmodic irritability of the muscles supporting the arch of the foot, occurring especially in patients whose arches are naturally high. The spasm is caused by congestion and injection of the small tarsal articulations, caused by abnormal pressure induced by the development of pronation, which in turn is induced by the slacking off in the muscle tone of the groups controlling the arch.

Inasmuch as the posterior tibial group of muscles is weaker than the peroneals, the spasm of the peroneals reflexly induced by this tarsal irritability tends to pull the foot over into a position of extreme eversion.

If this extreme rigid pronation is permitted to continue, and particularly if the patient keeps about on his feet, adhesions will form; and later still, erosions of the cartilage covering the articular surfaces of the tarsal bones may occur, which render the feet permanently rigid. (Painter.)

When considering treatment attention should be given to the removal of all local and underlying constitutional causes. Painter gives the following outline of treatment for the flat foot ordinarily encountered.

In the first or congested, sweaty stage, with but slight or no pronation and no muscle spasm, five or six days off the feet, accompanied by bandaging, massage, and alternate douching with hot and cold water is usually enough to relieve the acute symptoms. At the end of this time the patient may be permitted to be about on the feet, continuing the bandaging and douches, and he should be given in addition foot exercises to better the tone of the calf muscles.

In the second stage in which there is tenderness to pressure over the conventional points and where muscle spasm has commenced, holding the foot in a faulty position, fixation in a cast after overcoming the spasm should be instituted for a week or two. After removal of the cast then proceed as in the first stage, after the period of rest has been passed.

In the third stage in which there is rigidity, break up the rigidity under an anesthetic and resort to fixation in an overcorrected position in plaster for three weeks; then continue treatment with massage, exercises, and hydrotherapy. It is better in these cases to use supports for a time after walking is permitted for the reason that the tarsal joints after having their adhesions broken up are tender and require protection for a time before they can be permitted to bear weight. In this case a cast of the foot in plaster should be made and the plate carefully fashioned over it.

If proper precautions are observed in regard to muscle-training exercise afterwards, there should be but little liability to relapse.

No complicated system of muscle training is required in the treatment of flat foot; merely an insistence upon daily systematic performance of a simple group of exercises accompanied by hot and cold douching of the feet, and massage where it is possible to obtain it.

The following are the exercises which have been found sufficient to restore these cases to functional activity if faithfully followed:

1. Flex foot; extend foot; circumduct foot; alternately and in both directions.
2. Curl toes.
3. Feet parallel, roll up on outer borders.
4. Turn toes in, rise on toes.
5. Foot placed on floor. Keep ball of great toe and the heel on the floor and lift the inner border of foot as much as possible from the floor.
6. Resistive exercises for strengthening the peroneal and posterior tibial as well as the anterior tibial and gastrocnemius groups. The

resistance may be manual or by means of spring balances, weight and pulley, or elastic resistance.

The exercises should be done twice daily from 15 to 40 times each. After the exercises there should be a short period of hydrotherapy and massage. The exercises should be performed slowly. (w. m. k.)

ON THE TREATMENT OF TRAUMATIC SYNOVITIS.

The accepted treatment of purulent infections of the knee joint to-day appears to be that advocated by Willems as a result of his experience during the World War, namely, incision without drainage tubes into the joint cavity, and immediate active mobilization of the joint. Purulent infections of the knee joint in ordinary naval practice are comparatively rare, whereas traumatic simple effusions are very common, and the proper method of handling these simple effusions seems not to have been definitely settled in spite of the principles of treatment enunciated by Willems. Most authorities still emphasize the necessity for immobilization of the injured joint with splints until the fluid disappears. This results often in a prolonged convalescence with subsequent disability and weakness of the joint structures.

A study of surgical literature, according to Dr. Clarence A. McWilliams in a paper on the "Treatment of Traumatic Synovitis," which appeared in the *Annals of Surgery* of December, 1922, will show that with few exceptions writers have ignored the principles advocated by Willems as applied to traumatic effusions—that is, aspiration of the fluid and immediate mobilization of the joint.

Mobilization was recommended by Lucas-Championnière 40 years ago, and John B. Murphy advocated repeated aspirations, to be followed, however, by absolute immobilization with traction. From our war experience it seems to McWilliams that aspiration without mobilization is incorrect and that the most efficient method of treatment appears to be a combination of repeated aspirations with immediate mobilizations without splinting. This treatment is advocated by Willems, who, in "Surgery, Gynecology, and Obstetrics" of June, 1919, says, "It is now some years since my attention was directed to this problem [traumatic joint effusions], and I have freed myself by degrees from practicing the law of immobilization. I have commenced with evacuatory punctures to drain traumatic effusions of the knee, hemarthroses and hyarthroses, and by making the patient walk immediately. Not only could they do this without any difficulty, but their lesions cured in a few days without leaving any trace. My method of treating traumatic effusions by puncture, followed by immediate movements, was rapidly adopted by practi-

tioners dealing with industrial accidents, owing to the great rapidity and perfection of the recovery and also owing to its great simplicity.

McWilliam's comments on the management of traumatic effusions of the knee joint which follow are worthy of thoughtful consideration in the light of Willems's experience:

"The increased secretion of synovial fluid is the result of nature's attempt to float apart the two inflamed surfaces. Distention produces stretching of the ligaments with subsequent weakness of them. Pain caused by attempts at moving a distended joint, together with decreased circulation, consequent upon pressure, due to the fluid, produce quickly flabbiness, weakness, and even atrophy of the muscles. Synovial fluid is more slowly absorbed than it is secreted, but when the fluid portion is absorbed a gelatinous residue is left which coagulates. This coagulum may organize, producing adhesions with its consequent partial or complete ankylosis. In addition, small particles may be broken off the coagulum and become loose in the joint, producing the so-called 'rice kernels.' Hence the effusion should be removed at the earliest possible moment after the injury so as to prevent the formation of this coagulum, and the joint should be kept free from fluid by repeated aspirations subsequently, even as often as every second or third day.

"The pain attendant upon any movement of an acutely distended joint is agonizing. It is surprising how immediate is the disappearance of pain after aspiration of the fluid. As the fluid subsequently reaccumulates, pain returns, to be immediately relieved by subsequent aspirations. This gives the key to the treatment. The aspirations should be repeated as often as the fluid reappears. Combined with the aspirations should be active, but not passive, motions of the joint with walking begun immediately after the aspiration. If there be a sprain of the joint, strapping may be applied so as not to restrict the motions too much. If there be lateral mobility, a hinged lateral brace should be fitted which prevents twisting and lateral strain but allows normal flexion and extension of the joint. The motions are only active because with these pain will prevent their being carried so far as to produce additional lesions; passive motions, on the other hand, are blind, and therefore are not permissible because of the danger of their being performed too vigorously, thereby increasing the effusion of blood and synovial fluid because of the additional lesions caused thereby.

"The simplicity of the aftertreatment is its great advantage, together with the rapidity of the convalescence. There need be no artificial massage, bakings, passive motions, nor any other physiotherapeutical means, save possibly an ice bag, since the active motions produce all the effects artificial massage accomplishes. Aspiration of the knee is as simple and innocuous as aspiration of the chest.

Tincture of iodine and a sterile aspirating needle are all that are necessary. The needle is inserted, without touching its point with the fingers, 1 inch to the inner side of the patella just above its lower border. It is inserted outward and upward and its point comes to lie behind the patella and between the tibia and fibula. If aspiration be done soon after the injury the effused blood will not be too thick to be aspirated through a fair-sized needle. Hence aspiration should not be the last resort, but the first to be done, since it may be impossible to draw off the coagulum which later results. There need not be the slightest fear of infecting the joint if ordinary aseptic precautions be adopted. One does not hesitate to aspirate a chest through fear of infection, and the same should be true of the knee joint.

“With repeated aspirations and active movements of walking, a patient with an acute traumatic synovitis should be well in from 10 days to 3 weeks, with a painless, perfectly functioning joint, instead of the usual time of from 3 to 6 weeks, and a weak, tender joint with the liability to a recurrence of the fluid. The idea of the necessity of immobilization in traumatic synovitis seems to have so firmly imbedded itself in the surgical consciousness that dislodgement of it would seem almost impossible. The first thing necessary is for authorities who write text-books to cease advocating this obsolete method; then gradually the practitioner will take up the better procedure. Stress should be laid on the preliminary necessity of aspiration of the fluid from the joint in order that pain may be lessened and immediate mobilization may be rendered possible, following which aspirations should be repeated as often as necessary to keep the joint free from fluid.” (W. M. K.)

ON THE RÔLE OF POISONOUS AMINES.

During the past year work in India on certain poisonous amines has emphasized the importance of these substances in inducing disease. Amines are the end product of proteid digestion or disintegration, the sequence of events being the conversion of proteids first to proteoses, then to polypeptides, thence to amino-acids, and finally to freely soluble and absorbable amines. They may be produced by the action of bacteria or fungi or by tissue autolysis in the intestines. When absorbed into the blood stream amines circulate either as amine base or as acid salts. The Indian Medical Gazette for November, 1922, gives prominence to the rôle of poisonous amines, which promises to be a new chapter in medicine.

According to Sir Frederick Mott and Dr. T. Uno, the essential factor in surgical shock appears to be histamine action. Shock, as

we know, is more marked in cases with extensive muscular injuries, tissue lysis, and absorption of histamines than in cases with much hemorrhage but little tissue injury. The circulation of the histamines causes blood stasis to occur in the capillaries generally; plasma exudes through the capillary walls into the tissues; the haemoglobin index and the red-blood count will rise. Chromatolysis occurs in the cells of the automatic nuclei of the medulla and in the bulbo-spinal motor nuclei.

Maj. H. W. Acton, of the Indian Medical Service, has shown that lathyrism, a form of spastic paraplegia, is due to absorption of a poisonous amine from certain classes of vetch foodstuff, the amine being the product of enzyme action in the seed on the proteids of the grain during the months of high atmospheric humidity and temperature. In conjunction with Major Chopra, of the Indian Medical Service, Major Acton has found that the germinating processes of *Khesari dāl* sold in the bazaars in India increase the total amount of amine in the grain, which explains the frequency of this disease during the monsoon season. There appears to be a close association between an exclusive vetch diet in famine years and the frequency of lathyrism.

Epidemic dropsy of Bengal appears to be an amine disease, the amine being the product of fungus action on decorticated rice. In lathyrism, according to Acton, the amine produces vascular stasis and the lesion results from thrombosis from arterial spasm of the small blood vessels supplying the antero and antero-lateral spinal tracts below the second lumbar root. In epidemic dropsy the amine seems to cause increased capillary permeability and a raising of the blood pressure factors which cause the edema of the disease. Poisonous amines may be a factor in the edema disease encountered in Haiti.

In a paper on the pathology of cholera, Majors Acton and Chopra bring out another point regarding the poisonous amines. In bacillary dysentery it has long been recognized that bacilli of the Shiga type are far more toxic than are bacilli of the Flexner type. On ordinary broth neither bacillus produces any appreciable amount of toxin. But if the Shiga bacillus be grown on a broth rich in amino acids it yields an abundant supply of dysentery toxin. The Flexner bacillus under these conditions yields very little. The Shiga toxin is of the chemical nature of an amine and the clinical symptoms of Shiga dysentery can be produced in animals with it. Similarly in cholera, the cholera vibrio produces an amine, in the same way as it attacks the amino-acid tryptophane to form indol.

In both Shiga dysentery and cholera everything appears to depend upon the nature of the intestinal contents upon which the bacteria act. If an abundance of amino acids is present—i. e., abundance of

the products of proteid digestion—toxic amines will be produced in abundance and the disease will be severe. On the other hand, if the diet has been of such character as to leave but little proteid residue in the intestines, the bacteria will produce but little toxic amines and the disease will be of a mild character.

As C. M. Hutchinson has shown, even a change in the degree of hydrogen ion concentration in the intestinal contents may be a factor in the production of poisonous amines by facilitating the growth of amine-producing bacteria.

"Thus," remarks the writer in the Indian Medical Gazette, "in diseases of the tropics due to poisonous food principles, to bacteria, and even to protozoa, there opens up a new field for investigation. The bacteria and protozoa concerned may be, and often prove to be, perfectly harmless. *Entameba histolytica*, for instance, only produces symptoms in some 10 per cent of the persons parasitised by it. Under conditions as yet but little understood, however, the entameba may suddenly wake into deadly activity. It is a study of these conditions that is wanted. It may be changes in the substrate [intestinal contents] which determine the severity of many tropical diseases. Much further work remains to be done in the study of such diseases, but it is work of a character which may lead to a far better understanding of the disease concerned and to new and more successful lines of treatment and prevention." (W. M. K.)

SOME GENERAL PRINCIPLES OF DERMATOLOGICAL TREATMENT.

In treating the skin diseases most frequently encountered on board ship there are certain general principles which should be understood if we are to attain the results desired from our therapeutic measures. Obviously the etiology of the disease should be determined if possible; we should know whether the disease is confined solely to the skin or whether it is a symptom of some constitutional disorder.

The dermatoses which are due to an invasion of the skin by bacteria or parasites or to chemical and mechanical irritants are generally local and respond to local treatment. Others are symptomatic of some known or unknown constitutional infectious agent. Still others are due to faulty metabolism or food sensitization.

The fact that the skin manifestations are due to an internal disorder has an important bearing on the prognosis, but does not prevent a great deal being done in the way of local treatment to relieve the patient's discomfort.

When applying external remedies for cutaneous diseases we should bear in mind the general rule that when the skin is greatly inflamed, soothing and protecting applications are called for. As an illustra-

tion, in any acute dermatitis in which there is heat and redness and sometimes the formation of vesicles, much relief can be obtained by covering the part with a gauze dressing kept wet with a mild antiseptic solution such as liquor alumini acetatis N. F., which should be diluted, one part of the solution to eight parts of water; even boric acid solution will be found beneficial.

When the condition has reached a subacute stage Lassar's paste with 1 per cent salicylic acid or the calamin and zinc lotion are useful, or the two may be alternated.

Lassar's formula consists of one part each of zinc oxide and starch and two parts of vaseline, to which is added 1 or 2 per cent of salicylic acid. It is a rather thick paste, which allows exudation to pass freely from the skin instead of holding it there as the ordinary ointment tends to do.

The calamin and zinc lotion is distinctly more drying than Lassar's paste. It consists of 3 to 6 grams each of calamin and zinc oxide to 100 cubic centimeters of water, or 50 cubic centimeters each of lime water and distilled water; to this is sometimes added minute quantities of carbolic acid and glycerin. This lotion is sopped on the skin with a piece of gauze and allowed to dry.

If the subacute inflammation becomes of a chronic nature a slightly more stimulating treatment is indicated, such as a weak tar ointment consisting of crude coal tar 1 part, starch 2 parts, and petrolatum 5 parts.

If there is beginning infiltration of the skin, the amount of tar should be increased and its effect may be intensified by adding 1 or 2 per cent of salicylic acid.

The bacterial skin disease most commonly encountered is impetigo contagiosa. It responds readily to ammoniated mercury ointment. The crusts should be softened and removed by the application of a gauze pad soaked in warm soapy water. The lesions are then dried by means of gauze and a weak (2 to 5 per cent) ammoniated mercury ointment is applied. The ammoniated mercury ointment of the U. S. P. (10 per cent) is too strong and will irritate the skin in most cases.

The most common example of a parasitic skin disease is scabies, for which sulphur ointment to which balsam of Peru has been added is the remedy. However, if it is not properly used and if certain measures of disinfestation are not carried out the patient often fails to get well or soon becomes reinfected. If the sulphur ointment employed is too strong or used too long a sulphur dermatitis which is quite resistant to treatment is apt to occur.

The ointment recommended by Stelwagon especially for patients with delicate skin consists of sublimated sulphur and balsam of Peru 2 to 6 parts, benzoinated lard and petrolatum of each 12 parts.

In order that the treatment may be properly carried out a large amount of this ointment should be available to the patient; a jar containing 350 to 500 grams is required. It will be found convenient to have the directions for treatment printed, as the patient is apt to forget the details of the treatment told him at sick call.

A favorite routine is as follows:

1. Take a hot bath at night, during which scrub the body well with soap. Dry by rubbing the skin with a coarse towel.

2. After the bath rub the ointment well into the skin over the whole body, excepting the face and head. Give special attention to the hands, arm pits, abdomen, and penis. Use one-third of the jar of ointment assigned to you each night for three nights. While using the salve wear the same underclothing. Do not bathe again until the fourth day.

3. Bring all of your underclothes and towels to the sick bay to be sterilized.

4. On the fourth day take a bath and change underclothes.

If these directions are carried out faithfully the parasite—*sarcoptes scabiei*—will be destroyed in three nights' treatment and in the course of a week or ten days all the papules and scratch marks will have disappeared. If the skin has become badly irritated the calamin and zinc lotion will be found beneficial.

The *sarcoptes* is often easily found in the untreated lesion, and if it can be demonstrated "alive and kicking" to the patient he is apt to take greater interest in the treatment.

It is reasonable to expect that the sterilization of all the patient's underclothes and towels will assist in preventing a reinfection.

An example of fungus infection of the skin commonly seen, especially in the Tropics, is dhobie itch (*tinea cruris*), due to *Epidermophyton inguinale*. This infection is commonly found in the genito-crural region and fortunately responds readily to salicylic acid. The lesion should be rubbed vigorously by means of a wooden applicator to which is attached a cotton swab saturated with a 25 per cent alcoholic solution of salicylic acid.

The alcohol is permitted to evaporate, and then the lesion is dusted with a zinc oxide and starch powder. The treatments, which are painful at first, should be given daily, paying especial attention to the margin of the lesion. The condition usually clears up in about 10 days. In order to prevent a recrudescence of the condition an ointment consisting of 6 per cent salicylic and 12 per cent benzoic acid in vaseline or benzoinated lard should be used at intervals of two or three days for a month or two.

Seborrhœic dermatitis of the scalp is frequently seen, and the most important external remedies for it are salicylic acid and resorcin. They may be conveniently applied in the form of an alcoholic lotion

containing 2 to 4 per cent of each, to which may be added a small amount of castor oil, if the scalp be dry. This may be applied nightly for a time, then once or twice a week, followed by a shampoo with tar soap in the morning.

Seborrhœic disease of the scalp is very prone to recur, due probably to reinfection from the hair brush, comb, or hat. To prevent this a lotion containing 2 grammes of resorcin and 0.3 gramme of bichloride of mercury to 100 cubic centimeters of equal parts of alcohol and water should be rubbed into the scalp two or three times a week. It should be remembered, however, that resorcin is apt to stain blonde hair. (W. M. K.)

ON THE VALUE OF THE WASSERMANN REACTION AS A CONTROL OF TREATMENT.

Prior to the introduction of arsphenamin the question of absolute cure of syphilis did not arise. It was realized fully that syphilis is intermittent in its manifestations and is capable of revealing itself in lesions of the gravest significance months or years after apparent cure. The object of treatment in the prearsphenamin days, therefore, was to clear up existing manifestations, and to prevent their development in the future.

The demonstration of the *treponema pallidum* by Schaudinn, its cultivation by Noguchi, the application of the Bordet-Gengou phenomenon to the diagnosis of syphilis by Wassermann and the synthesizing of salvarsan by Ehrlich, altered our view point and led us to hope for something more.

In the first burst of enthusiasm we thought we were able to cure early syphilis with mathematical precision, and with the Wassermann reaction to guide us we felt secure in our treatment. The object of treatment became an assault on the positive Wassermann reading instead of an attempt to deal successfully with syphilis as a morbid condition, and even at the present time the tendency is to trust almost entirely to the Wassermann readings as a control of treatment. A typical present-day standard of cure demands a negative Wassermann reaction for at least a year in both the blood and cerebrospinal fluid, and this should continue negative after a provocative injection of arsphenamin. In other words, we aim to treat the patient until the Wassermann reading remains permanently negative.

In a paper on "The Standard of Cure in Syphilis," which appeared in the American Journal of Syphilis, A. R. Fraser brings to our notice some statements regarding the value of the Wassermann reaction as a control of treatment which are worthy of thoughtful consideration. He says:

"It can not be gainsaid that the Wassermann reaction carefully carried out in the full knowledge of its many sources of error gives valuable diagnostic information regarding syphilis, in spite of the fact that the mechanism and rationale of the test are but imperfectly understood. That the reaction is only an empirical test can not be too strongly emphasized. There is a fundamental difference between the Bordet-Gengou phenomenon and the Wassermann reaction. In the former, complement is deviated by a true antigen and homologous antibodies, which form a true complex. In the latter, however, the 'antigen' is a suspension of certain lipoids, and therefore a 'pseudoantigen.' The complex is therefore a 'pseudocomplex.' In view of the fact that this test evolved from the application of the Bordet-Gengou phenomenon to the serum diagnosis of syphilis, 'it is a coincidence that the reaction ever came to be elaborated, and a very remarkable coincidence, indeed, that the information which it gives is accurate.' (Tulloch, W. J.: *Edin. Med. Jour.*, 1921, xxvii, 34.)

"Frankly, we are unaware of the origin and nature of the property of syphilitic serum which forms this pseudocomplex. The evidence that it is due to true antibodies is incomplete. Nor is there sufficient evidence that this property is spirochetal in origin, either directly or indirectly. The elaboration of heterogenetic antibodies which are capable of forming a pseudocomplex with a suspension of lipoids, and therefore capable of deviating complement, is probably a large part of the explanation. Thus we find ourselves dealing with a test which is essentially empirical. Its interpretation, therefore, must have a clinical basis. We find that leprosy, certain protozoal infections, cases of hyperthyroidism, acute rheumatic fever, and more controversially, chronic malaria, are capable of giving definitely positive Wassermann readings. Tuberculosis also has the faculty of elaborating sufficient heterogenetic antibodies to partially deviate complement in the presence of a Wassermann 'antigen.' The clinical basis of the test, therefore, can not be overstated. In this connection Tulloch writes: 'I would draw attention to the fact that the only information upon which the efficiency of the test can be assessed, is obtained by sound clinical observation * * * The treatment of syphilis is a serious responsibility to assume, and if the attitude of the laboratory worker be that it is his duty to protect the nonsyphilitic from unnecessary treatment, rather than to diagnose every case of the disease, active and latent, he is on safe ground * * * Syphilis is so protean in its manifestations that only those who have a knowledge of the multitude of ways in which it may affect the health of the individual who has acquired it, and, more important still, may affect the health of his or her offspring, can supply the information required for assessing the value of the test, and, to attain the

necessary clinical exactitude involves experience which relatively few men are in a position to obtain.'

"The place of the Wassermann reaction in the diagnosis of syphilis is well defined. In the diagnosis of obscure conditions of ill-defined etiology the test is also a valuable aid. Its place, however, in its relation to the treatment of syphilis is not so clearly understood. The belief that a positive reading indicated spirochetal activity and a negative one meant complete spirochetal extermination has been rudely shaken. We have encountered so often cases which we considered adequately treated suddenly developing symptoms while the serum reaction was negative, and so-called 'Wassermann-fast' cases which remained symptomless while the reaction was positive, but developed symptoms as soon as the reaction became negative, that we have been called upon sharply to review the position. Realizing that we are ignorant of the origin of 'Wassermann body,' its relation to the living spirochetes, its duration or rate of production after complete spirochetal eradication, or the significance of its absence in the presence of symptoms, we are forced to the conclusion that the test is without value as a control of treatment.

"Many indictments of the Wassermann reaction have been made, particularly by Lisser (*Jour. Cut. Dis.*, 1919, xxxvii, 754; Palmer (*Urol. and Cut. Rev.*, 1921, 253); Graves (*Med. Record*, 1920, xcvi, 1025); Reynolds (*Brit. Med. Jour.*, 1921, ii, 183); Sargent (*Am. Jour. Syph.*, 1920, 286); and Oettinger (*Am. Jour. Syph.*, 1920, 297). These discussions have as their object mainly the placing of a reasonable instead of a dogmatic interpretation on the value of the reaction. The danger of treating the positive Wassermann reading instead of the syphilitic patient has been pointed out by Graves, and by Duncan and the writer. (Fraser, A. R., and Duncan, A. G. B.: *Brit. Jour. Derm. and Syph.*, July and August, 1921; and Fraser, A. R.: *Am. Jour. Syph.*, 1921, 201.) The susceptibility of the Wassermann reaction to alcohol and to ether and chloroform narcosis must not be forgotten as an indication of the waywardness of the phenomenon. The test, therefore, is neither infallible nor specific, and its value is greatest when its fallacies and limitations are appreciated fully.

"In spite of exhaustive modern treatment we find that active symptoms are liable to occur and recur at any time throughout the latent period of the disease, that the Wassermann reaction may vary from negative to positive and again to negative at intervals without warning or apparent reason, and that certain patients whom we are unable to classify or identify possess an inherent potentiality to become tabetics or paretics.

"Thus two distinct schools of opinion exist. One holds that the Wassermann reaction is a useful adjunct in controlling progress and

treatment as expounded by Sargent and by Rohdenburg, Garbat, Spiegel, Manheims, and others. The limitations of the test are recognized, a negative reading is interpreted with caution and reservation, and the importance of many subsequent examinations is appreciated. This is a much more rational hypothesis than that entertained by extremists, who simply lay down a certain number of negative readings over a certain period as a standard of cure.

"The second school is prepared to admit the undoubted value of the test as an aid to diagnosis, but is persuaded that it is without value as a means of controlling treatment. Its policy is summed up in the statement that 'treatment directed against the Wassermann and regulated by it is misapplied.' A positive reading in itself is not a harmful condition, being a normal reaction of the body to the spironema. With this opinion we concur. By treating the individual patient instead of treating his Wassermann reaction we can do much more for him than merely turning his positive Wassermann reading into a negative one." (W. M. K.)

NOTES AND COMMENTS.

The interpretation of the problems of resistance and immunity in terms of the actual and intimate mechanism of the destruction of organisms within the body is still a problem awaiting elucidation. For a long time the matter has been in dispute between two main schools of thought, one following the phagocytic theory of Metchnikoff, and the other espousing the so-called humoral theory which grew out of Nuttall's classical experiments on anthrax and was enlarged and sustained by the work of Pfeiffer. Of later years an excessive devotion to the humoral theory has led to many interesting discoveries in the nature of serum reactions which are of the greatest practical importance in medicine, but has rather drawn attention away from the problem of immunity in its strictest sense and left us instead with a series of tests for infection which may have but little bearing upon the process of resistance within the body. The work of Denys and Leclercq, followed by the more detailed studies of Wright, has tended to show that, as so often is the case, the truth may lie in a middle path and that both of the agencies upheld by the rival schools may participate to bring about one and the same result.

This opinion, we are informed by a writer in the *Lancet* of December 30, 1922, is that generally adopted at the present day to explain the phenomenon of antibacterial immunity.

In a recent number of the *Annals of the Pasteur Institute*, Nicolle and Cesari present a very readable and fair account of the present position of the phagocytic doctrine, which is summarized in the *Lancet* as follows:

"In reviewing the subject they define a phagocyte as a cell, either fixed or mobile, which has the property of taking up and digesting (when this is possible) formed particles. The ability to engulf these particles is intimately allied to the motile nature of many of these cells, and these two properties appear to vary with the same conditions. Ameboid movement and emigration from the vessels are the result of changes in surface tension of the cell, which are brought about by physical and chemical means, and the direction of such movements depends upon the relationship of the cell to the mode of diffusion of the agent causing these changes. Other things being equal, the rate of movement of the cell is a function of the temperature. The actual process of phagocytosis resolves itself into three

acts: Adhesions of the particle to the surface of the phagocyte, englobement of the former, and its digestion. The act of adhesion is a brief phase and not readily seen with bacteria under the usual condition of experimentation. It is, however, readily observed with large particles at low temperatures, in which case phagocytosis does not proceed beyond this stage. The engulfing of the particle may take place in two ways: With large particles, and active cells, the latter flow around the invader and engulf it in the way in which it is commonly stated that an ameba feeds; but with nonameboid cells, or with motile cells which are less active, the particle enters the phagocyte by 'simple penetration' passing, apparently actively attracted, through the cytoplasm of the cell into its interior; this would appear to be an important mechanism in the phagocytosis of bacteria. In thus engulfing particles the mechanism followed in any particular case appears to depend upon the viscosity of the cell cytoplasm which, again, may well be a function of the temperature at which the reaction is observed. The sequential digestion of the particles is a matter of intracellular ferments and, in the case of formed particles, is probably aided by the absorption of antibodies and complement prior to their being taken into the leucocyte cell-substance. With regard to the relationship of antibodies to phagocytosis the function of the latter, in the case of resistance to soluble toxins, is unknown. In the case of bacteria these may be destroyed by both intracellular and extracellular agencies; where the organism is of a fragile nature and the subject possessed of a high degree of immunity extracellular destruction is a prominent matter, but in the minor grades of immunity the humoral factor becomes less evident and the cellular one more so, although it is not to be assumed that when antibodies can not be demonstrated by the current methods that they are absent.

"To epitomise this view in a few lines, immunity is the result of two allied mechanisms, both resulting from a single cause—infection—but the two factors in play, the humoral and the cellular, are independent and autonomous, and in different cases either the one or the other may have the greater prominence. In the case of acquired immunity the enhanced phagocytosis there seen is the result of the presence of specific antibodies, the leucocytes having no specially increased activity, the doctrine of the habituation of the leucocyte toward a given virus being a myth. The authors conclude by examining the methods of estimating immunity and the protective power of a given serum. At present the only reliable procedures are the examination of its protective power for experimental animals, and the titration of its ability to cause fixation of complement in the presence of the specific antigen. In their opinion the evaluation of the power to cause phagocytosis would combine the information

given by these two procedures, but considerable improvements in technique are necessary to enable such a procedure to become a practicable means of accurately correlating the properties of a serum in vitro with its therapeutic power."

Ben Jonson began his Epigram to the Smallpox with the apostrophe:

Envious and foul disease, could there not be
One beauty in an age and free from thee?

and the literature of the next centuries contains many expressions of the repulsion with which smallpox was regarded.

We are informed by the British Medical Journal that many of these were collected by Dr. J. C. McVail in an article he wrote in 1893. The evidence is conclusive and all goes the one way. Coming down to the nineteenth century, we may recall how Mr. Holman Hunt related in the Times a conversation he had had with Dr. Stephen Lushington, the famous lawyer whose portrait he had painted. Lushington was born in 1782 and lived until 1873. His name is now, perhaps, best remembered for his share in the separation of Lord and Lady Byron in 1817. He was not only a very distinguished lawyer, who became judge of the high court of admiralty, but one who in his time had mixed much in society, both political and aristocratic. Holman Hunt asked him for his opinion as to the good looks of the woman at the beginning of the nineteenth century as compared with those of the women of the period in which the conversation took place. Lushington began his reply by saying that it was difficult to make any comparison, because in his early days it was very rare to see a young woman who had not a pock-marked face, so common was smallpox. Another instance of the way in which vaccination was regarded early in that century is afforded by what Joseph Farington—extracts from whose diary of the period between 1793 and 1821 are being published in the Atlantic Monthly—had to say upon the subject of the opposition to vaccination in 1806. Farington was a landscape painter of considerable repute, a member of the Royal Academy, who lived from 1747 to 1821. In his diary under date June 27, 1806, he wrote: "The opposition to vaccine inoculation was spoken of and its destructive effects and the necessity of doing something to prevent it. Wilberforce [William Wilberforce, of antislavery fame] had said in the House, when the difficulty of discouraging the natural smallpox was under discussion, 'should the plague appear in the country would you not consider it necessary to stop its progress and why not this fatal disorder.' Barnard much ap-

proved this. Doctor Jenner's disinterestedness was [already] mentioned. Before he published an account of his discovery, Sir Walter Farquhar said to him that if he chose to preserve it a secret he might make £100,000 by it. It would be easy for him to prove its value to medical men of character, who would recommend and warrant its efficacy, which would enable him to get £10,000 a year by it; but Doctor Jenner determined to give it at once to the world. Wilberforce said the obstinacy of the people in refusing to avail themselves of it seemed to rise out of their characteristic disposition; they would be at liberty, and sulkily say they would do what they pleased with their own. 'I will,' continued he pleasantly, 'have a right of choice.' 'If I have a mind to beat my wife, who shall hinder me.' But, he added, though people can not be forced to use vaccine inoculation, some inoculation might be forced of necessity. He said the vaccine inoculation has spread more considerably in other countries than in England. Even in remote countries, and even in China, a country in which innovation is jealously opposed, it has been admitted. In India it is used." Glancing over some of the periodicals antivaccinists issue to-day, a note like the following (*The Vaccination Inquirer*, August 1, 1922, p. 98) strikes the eye: "The chairman (at Tauton) 'was afraid some people needed an epidemic to teach them the need of vaccination,' and we ourselves fear another epidemic may be needed to fully reveal to them its [that is vaccination's] murderous folly!" Surely a person who thinks in that strain must have a mind which responds merely by opposing what everybody else affirms. It may partly be the fault, as Wilberforce suggested, of the traditional British "bulldog" obstinacy in claiming to "do what they pleased with their own."

That the fight against preventable diseases is not as hopeless as it sometimes seems may be impressed upon us by a survey of what has already been accomplished, especially in the Tropics. A world-wide warfare on preventable disease is now being waged by sanitarians under the leadership of such organizations as the Rockefeller Institute, the various British and American schools of tropical medicine, the Dutch Institute of Tropical Medicine, and the French Institute of Colonial Medicine.

It is not unlikely that before long yellow fever will be a thing of the past; that uncinariasis, endemic in a zone that embraces half of the earth's population, will be driven from any community which has the will to get rid of it; and that malaria will be eradicated from every community possessing sufficient vital force to push a thorough campaign for the extermination of the disease.

The World War served to demonstrate on a large scale that the pathogenic organism can be conquered by the science of sanitation. But for preventive medicine the trenches and crowded camps might have become infernos of infection. With the return of peace the knowledge of disease prevention gained during the war was carried to many lands.

In a popular article on "Map-changing Medicine," which appeared in the *National Geographic Magazine* of September, 1922, W. J. Showalter reviews what is being done in various parts of the world. He says in part:

"No other disease is more easily cured or is more effective in demonstration than hookworm. In the zone where hookworm is prevalent, most of the backward people of the world live, and there is some ground for deciding that the cumulative effect of this disease is responsible for such backwardness. When operating in conjunction with malaria the hookworm is doubly an evil, and both diseases reach their highest development in the same environment—the hot, damp regions of the earth. Deaths due to hookworm are higher in percentage than those traceable to almost any other disease except tuberculosis. It affects the welfare of humanity over vast and populous regions, lowering the victims' resistance to other infections, dulling the mind and sapping the strength. Its every stage is known at the present time, and methods of combating it are also known. The fact that cures are effected so quickly convinces a community that can not see the advantages of vaccination against smallpox or the value of water purification against typhoid, and still clings to the idea that tuberculosis is hereditary and not infectious.

"Even more insidious than the hookworm is malaria, which is affecting the lives and happiness of 800,000,000 people who dwell within the areas where it is endemic. It was Maj. Ronald Ross, the British Army surgeon, who was finally able to pin the crime of spreading malaria on the anopheline mosquito. Through his efforts malaria was wiped out of Ismailia on the Suez Canal. Panama and a hundred other places have been largely freed from malaria by the application of his principles for control. In 1919, due to a conference composed of the United States Public Health Service, members of State boards and directors of the International Health Board, and local health authorities, at a cost of 78 cents per capita, 52 communities formerly hotbeds of malarial infection were largely freed from the disease. This was done by simple drainage, filling pits and shallow pools, channeling streams, clearing the margins of streams and ponds, oiling, and the administration of quinine, and the use of the top minnow, a tiny fish, which is considered even more effective than oiling in the destruction of the baby mosquitoes before

they reach flying age. It has been demonstrated that it costs one-fourth as much to get rid of malaria as to keep it.

"Maj. Walter Reed and his fellow workers demonstrated that yellow fever is a mosquito-borne disease. General Wood and Colonel Gorgas by following the principles laid down by Reed banished it from Cuba. It was also driven from Panama, Rio Janeiro, and Vera Cruz, and finally from Guayaquil. Dr. Hideyo Noguchi, now of the Rockefeller Institute for Medical Research, made extensive experiments in Guayaquil, discovered the organism causing yellow fever, developed a serum for its treatment, and also a vaccine which has prevented thousands of people in disease areas from getting it.

"Sanitary science is able to hold out to humanity a charter of freedom from three of the greatest scourges that have beset mankind. In all the dependencies of America and Great Britain sanitarians have carried the tidings of better health. Japan has also shown how high death rates may be cut and well-being promoted even among illiterates. China, however, with its fifth of the population of the world, still remains for the western civilization to reach, for her agencies on these lines are as antiquated as the ox cart and pony express. Her death rate reaches 40 per 1,000, or 13,000,000 per year. Missionaries and a few medical schools have made tremendous efforts, but all together they constitute only a drop in the bucket. A great university, the Peking Union Medical College, with its faculty recruited from the best institutions of the West, has thrown open its doors. Its aim is to develop in China an adequate corps of trained Chinese physicians and nurses and to establish thoroughly equipped hospitals.

"The most productive half of the earth's surface lies in the latitudes where contagion is most rampant. As humanity expands it must look more and more to the Tropics for food. Its food-producing potentialities beggar description, and the sanitarian has proved his power to break the domination of the disease germ, and so make it possible for the white man to live in safety in the Tropics."

Examination of the feces in long-standing cases of chronic intestinal amebiasis only reveals encysted amebae, and their great rarity in some instances is such that the examination may have to be repeated several times. Even then, as we are informed by an editorial writer in the New York Medical Journal of December 6, 1922, the result may be negative although the patient is really a carrier of the parasite. On account of the rarity of the parasite there ensues a real difficulty in diagnosis, while encysting of the organism causes real difficulty in treatment.

Le Noir and de Fossey have attempted to place amebiasis in evidence and to treat it in better conditions by momentarily creating a medium favorable to the development of the parasite by provoking an artificial, benign, acute phase—a reactivation—during which one may more easily make a microscopic diagnosis and obtain the maximum effect from treatment by acting upon new forms of the parasite. To attain this end these observers administered biliary extracts to their patients, either in the form of desiccated bile contained in keratinized capsules or some of the commercial preparations. Nine capsules each containing 20 centigrams of bile extract are given daily, three at each meal, and each day the dose is increased by one capsule at each meal. This increasing daily dose of three capsules is continued until a free evacuation of the bowels ensues. During this treatment the patient continues his ordinary diet.

By this medication, after a lapse of time varying according to the subject, liquid stools appear in which living amebae are found, as well as numerous cysts. If at this time an energetic treatment is resorted to, the younger, hence the more vulnerable, types of parasites are attacked. Le Noir and de Fossey have carried out this test in numerous cases which they classify in three series as follows: In the first series emetine hydrochloride was exhibited in a single dose of 8 centigrams on the first day, 8 centigrams in two doses on the second day, and then 4 centigrams daily for four days. Eleven subjects were thus treated, nine being discharged much improved, and two less so. In six of these patients a new bile test, made before the patient was discharged, showed that the feces were free from amebae; in two others the parasite was still detected and a second treatment resulted in a complete success.

The second series comprised nine cases treated with Ravant's novarsenobenzol method, ipecac paste, and bismuth. A rapid improvement ensued. The third series of patients were treated with the double iodide of emetine and bismuth. The drug was badly tolerated and was changed to the treatment used in the second series, which resulted in a cure. Ravant's method, combined with rectal injections of mucilage, bismuth, and arsenobenzol (Taillandier's method) also resulted favorably. It is evident that the bile test is of interest from the triple point of view of the diagnosis, treatment, and prognosis of amebiasis.

That medicine and surgery owe much to the ancillary sciences of biology, chemistry, and physics is an obvious truism, but the help and inspiration that the profession of healing has received from pictorial and sculptural arts have not been so freely acknowledged, remarks a writer in a recent number of the *British Medical Journal*. In examining ancient descriptions of patients and morbid condi-

tions, the reader often looks anxiously, and too often in vain, for an illustration to clear away the mist of doubt left by the account in the text; but it is easy to recognize in old pictures examples of disease, such as achondroplasia, only within comparatively recent times awarded a place in our nosological lists. The value of art to medicine is by no means confined to illustration, great as that help may be, especially in anatomy, and in a thought-exciting paper on "The debt of medicine to the fine arts," read before the History of Medicine Section of the Royal Society of Medicine on December 20, Dr. J. A. Nixon of Bristol rightly laid stress on the intellectual stimulus that the fine arts have conferred on the followers of Aesculapius. He remarked that all the real progress in medicine has been won by those who, like artists, being by nature richly endowed with keen gifts of perception, have retained those gifts unimpaired, together with the Hippocratic secret of vivid mental imagery. Artists and medical men have different ways of looking at things; scientific and medical training often dulls the power of mental imagery that gives accuracy to our perceptions and justness to our generalizations, and, as Doctor Nixon points out, the acuity of observation shown in the masterpieces of Praxiteles and Phidias finds expression in the clinical descriptions of Hippocrates, who saw with the eye of an artist. Harvey's genius lay in his powers of artistic perception, not employed for creative art or merely for illustration, though he was a keen student and critic of the fine arts, but applied to accurate observation; further, his power of imagination enabled him to construct hypotheses which he tested by way of experiment. Christopher Wren, the greatest draftsman of his age, had much to do with the invention of intravenous transfusion, and Leopold Auenbrugger, "a great friend of music and the arts in general," and the composer of an opera (*The Chimney-Sweeps*), laid the foundation of our whole method of physical examination of the chest by his *inventum novum* of percussion. Sir Charles Bell, who wrote of his discovery of the functions of the anterior and posterior nerve roots—"I know this will put me beside Harvey"—Louis Pasteur, J. M. Charcot, Sir James Paget, and others, such as Sir Prescott Hewett, though not so outstanding, had much artistic talent. Doctor Nixon's paper, though pleasantly expressed and without a trace of the odor of the midnight oil, must have been based on much research, as is shown by the excellent examples he brought forward to support his thesis that the best work in medicine has been done by those who have the qualities of an artist.

We learn from a recent issue of the *Lancet* that in a special number of the *Paris Médical* (December 2, 1922), devoted to recent advances in therapeutics, Dr. E. Emery and Dr. Alexandre Morin,

of the St. Lazare Infirmary, Paris, remark that the most interesting therapeutical acquisition within the last few months is the use of bismuth in the treatment of syphilis. This is not an absolute novelty, since it had been employed by Balzer at the Lourcine Hospital in Paris as long ago as 1888, but it was only after the work of Saverac and Levaditi in 1920, following that of Sauton and Robert in 1916 on its use in trypanosomiasis and spirilloses, that bismuth became generally recognized as an antisyphilitic drug.

Investigations of numerous observers, especially those of Saverac and Levaditi, have shown that whatever method of administration or preparation of bismuth is employed, the active substance is metallic bismuth. Its mode of action, therefore, more closely resembles that of mercury than that of arsenic. In the course of its administration bismuth becomes widely disseminated throughout the organism, chemical analysis having shown it to be present in the blood, cerebrospinal fluid, and almost all the organs, especially the liver, salivary glands, heart, and spleen. It has been detected in bile, urine, saliva, sweat, and feces, in all of which it is rapidly eliminated. When used in suitable doses, bismuth preparations have been found to be very active in all stages of syphilis, excluding parasyphilis. In the primary stage the time which the chancre takes to heal varies according to the size of the lesion; on the average, it is 13 days with four injections, but it may be as short as 4 days with a single injection, or as long as 25 days with eight injections. In the secondary stage the cure of mucous tubercles and oozing cutaneous surfaces takes place rapidly, and is effected on the average in 11 days with three or four injections. Emery and Morin agree with Clement, Simon and Bralez in regarding the action of bismuth as far superior to that of mercury, and comparable to that of large doses of arsephenamine. The same is to be said of the action of bismuth in tertiary syphilis, for gummata and osteitis show much more rapid improvement than with mercury, according to these writers, whose views can be summarized as follows: Visceral syphilis, in particular gastric syphilis and aortic aneurysm, is greatly benefited by injections of bismuth. In syphilis of the nervous system bismuth acts best on the recent manifestations of the secondary stages, especially on neurorecurrences. The best proof, however, of the activity of bismuth, according to Emery and Morin, is furnished by its effect on the Wassermann reaction. If the drug is employed early it prevents the reaction from becoming positive, while if it is delayed it renders the reaction negative, though not so rapidly as is done by arsenical compounds. Among the numerous preparations of bismuth employed in the treatment of syphilis the most popular are the tartrobismuthate of sodium and potassium, hydrated bismuth oxide, and the iodobismuthate of quinine. Other preparations sometimes

used are colloidal bismuth, precipitated bismuth, and ditrioxybismuthobenzol. All these preparations may be and are best given intramuscularly, though colloidal bismuth and ditrioxybismuthobenzol may also be administered intravenously. The advantages of bismuth medication consists in the fact that it is well borne, that it avoids the risks of arsenical preparations, that it occasionally is successful when arsenic fails, and that it apparently has a special action on neurorecurrences. Its drawbacks, such as local pain, skin eruptions, stomatitis, constipation, or more rarely diarrhea, depression, and headache, are comparatively trifling, and are mainly due to unsuitable preparations or excessive dosage.

The writers believe that syphilis can be treated effectually in all its stages by bismuth alone, but do not advocate an exclusive bismuth treatment, recommending that it should be combined with arsenical preparations and, to a much less extent, with mercury.

In this section of the Bulletin of November, 1922, mention was made of the old Chelsea physic garden, which is not nearly so well known to American visitors to London as it deserves to be. We learn from the British Medical Journal that in a charmingly written and attractively illustrated book, entitled *The Romance of the Apothecaries' Garden at Chelsea*, Dr. Dawtry Drewitt has presented the story of this famous spot. The London Society of Apothecaries broke off in 1617 from the great Grocers' Co., which, like Pharaoh of old, was loath to let them go, but was constrained by King James I to hold its peace. Soon afterwards the apothecaries' society gained possession of Cobham House on the bank of the Thames, "where the little Fleet joined it at Blackfriars;" but although the times were troublous and its hall was destroyed in the great fire of 1666, the society was able in 1673 to take a lease of three and a half acres in the then pleasant riverside village of Chelsea as a garden for the cultivation of rare plants. The official title "Physic garden" is a little misleading, for the word originally meant "concerning physical"—that is, natural—science, and the Botanic Gardens at Oxford and Kew formerly shared this label, which, however, naturally stuck to that of the apothecaries' society. Maintenance expenses weighed so heavily on the society that the garden would probably have been sold had not Sir Hans Sloane in 1722 practically made the society a gift of the site. As the present existence of the physic garden is largely the result of his generosity it is most appropriate that an account of Sloane's life should find a place in this record, and Doctor Drewitt happily remarks how well the present Sloane Street represents the life of Sir Hans, for do not "those who walk all the way

down it know that it is very *long*, obviously *prosperous*, and very *straight*." He observes too that, like Thomas Wheeler, for 42 years demonstrator of botany at the garden, Sloane died at the age of 93, which may therefore be regarded as a fatal year in the life of botanists.

In the description of the surroundings of the physic garden many interesting points are brought out. Thus in discussing Paradise Row (now Royal Hospital Road) the use of the word "paradise" as the equivalent of park makes it probable that Paradise Row led to the great paradise made in the sixteenth century by Sir Thomas More, now the Elm Park Estate; reference is made also to the translation of his own name by John Parkinson, apothecary to Charles I, into *Paradisus in sole* (Park in sun). Again, there is a fascinating sketch of Sir Joseph Banks, who as a boy lived in a large house close to the physic garden, and in later life did much for it. In 1893 the apothecaries' society handed over its charge to the charity commissioners, and a committee now superintends its management; it is, indeed, fortunate that Doctor Drewitt was made one of this committee, for thus was he stimulated to write a book that everyone will read with pleasure.

The American Medical Association will hold its seventy-fourth annual convention at San Francisco, June 25 to 29, 1923. Several other medical organizations will hold their annual meetings the week before, during, and the week after the meeting of the American Medical Association.

The California headquarters, under the chairmanship of Dr. W. E. Musgrave, have been opened at 806-809 Balboa Building, San Francisco. The central committee is anxious to have as many physicians as possible attend this convention and they have extended a special invitation to the officers of the Medical Department of the United States Navy to participate in the meetings.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review:)

Books received for review will be returned in the absence of directions to the contrary.

"If a book is worth reading, it is worth buying." (John Ruskin.)

COUNSELS AND IDEALS FROM THE WRITINGS OF WILLIAM OSLER. Selected and edited by *C. N. B. Camac, M. D.* Second edition. Houghton Mifflin Co., Boston. 1922.

In 1905 Doctor Camac, who was a pupil of Osler, prepared, with the consent and guidance of his beloved teacher, a volume of Counsels and Ideals, selected from 47 of Sir Will Osler's writings. The collection represented Doctor Osler's philosophy of life down to the time he was appointed regius professor of medicine at Oxford. The second edition, which has recently appeared, contains extracts from 26 addresses and papers published since 1904, which form an appropriate summary of Doctor Osler's general teaching in England. This little volume should be in every physician's library.

PRINCIPLES AND PRACTICE OF INFANT FEEDING, by *Julius H. Hess, M. D.*, professor and head of the department of pediatrics, University of Illinois College of Medicine; chief of pediatric staff, Cook County Hospital. Third Edition. F. A. Davis Co., Philadelphia, 1922.

The dependence of the infant upon its mother for food to supply its primitive needs is apparent when we recall the fact that one-fourth of the children born die during the first year of life and that 60 per cent of these deaths are due to nutritional disturbances, while a large portion of the remainder are dependent upon impairment of the infants constitution by improper feeding. During recent years, much study has been devoted to the subject of infant feeding

and it is, we trust, with a pardonable pride that we draw attention to the fact that much of the progress along this line has been achieved in the United States. Pepper and Meigs, of Philadelphia, gave us the first rational method of milk modification. They attempted to vary the percentages of casein in cow's milk, believing that the excessive quantity in cow's milk was in great part the cause of feeding difficulties. Rotch, of Boston, made further advances in that he taught that fat and sugar as well as protein were important factors in the disturbance of the artificially fed infant. More recently certain European observers, especially Czerny and Finklestein, have taught us the dangers of overfeeding with whole milk and with individual food elements.

In the present volume the author has presented the entire subject of infant feeding as it stands to-day in concise form. He begins the volume with certain general considerations, such as the anatomy, physiology, and bacteriology of the digestive tract of the infant and metabolism in infants.

In the section on the nursing of the infant, the author reputes the oft-repeated statement that the ability of the mother, particularly among the well-to-do, to fulfill this most important function is decreasing. That the young mother of to-day is better able to nurse her offspring than was her sister of 20 years ago is attributed to the fact that the youths of the present day are more vigorous, more prone to active exercise, than were those of an earlier date. After certain preliminary considerations, he discusses in turn maternal nursing, wet nursing, the nursing infant, mixed feeding and weaning, the nutritional disturbances in the breast-fed infant, and the methods of feeding premature infants.

Although it must be admitted that notwithstanding the many advances that have been made in infant feeding during recent years, no method of artificial feeding can perfectly replace nursing or human-milk feeding. This procedure has an important place in pediatrics, therefore, cow's milk, the adaptation of milk for infant feeding, milk dilutions with the addition of carbohydrates, cream and skimmed-milk mixtures, and feeding in late infancy and early childhood are adequately and clearly considered.

About a third of the volume, which contains over 400 pages, is given over to an illuminating discussion of the nutritional disturbances in artificially fed infants and in the last third of the book special diseases, such as rickets, spasmophilia, scurvy, acidosis, and the anemias of infancy are considered.

In an appendix the author brings together much useful information concerning proprietary baby foods, the preparation of infants' foods, the care of the bottles and nipples, infant hygiene, and various therapeutic procedures.

FEEDING, DIET, AND THE GENERAL CARE OF CHILDREN—A BOOK FOR MOTHERS AND TRAINED NURSES, by *Albert J. Bell, A. B., M. D., assistant professor of pediatrics in the medical department of the University of Cincinnati; attending pediatrician to the Cincinnati General Hospital, the Tuberculosis Hospital, and the Christ Hospital.* F. A. Davis Co., Philadelphia, Pa., 1923.

As is indicated by the title, this is not a book written especially for the physician, but for the mother or the trained nurse. In its preparation the author has taken great pains to make the volume instructive. In this he has succeeded, as the book contains those essentials of the subject expressed in a pleasing manner and with care as to detail which a mother should know if she is to rear her child in an intelligent manner, and with which a nurse should be familiar. Although the book is not intended for the physician it may be read with profit by many of us.

The author's plan of presenting the subject is clever. Avoiding the question and answer method which has been successfully used in some well-known books of this type, he emphasizes the salient point in each paragraph by a leading phrase or heading in large bold-faced type so one can see at a glance what is treated on every page.

Half of the book is devoted to the subject of feeding, and the child's diet is considered from its birth until it has reached high-school age. In this section the mother and nurse are skillfully guided through the nursing difficulties and the intricacies of artificial feeding. Considerable space is given to sample diet lists applicable to children from 1 to 12 years and the school lunch receives deserved attention.

Several chapters are devoted to the hygiene and development of the child. In the portion of the book set apart for the consideration of the diseases of children, the causes and the symptoms of the various diseases have been outlined and the "why and the wherefore" of certain therapeutic suggestions have been carefully explained, but the author has been careful to omit mention of all treatment which should be undertaken only by the physician. As the author says in the preface: "Every effort has been made to impress upon the mother and nurse the principles of the prevention of disease. With a better knowledge of the underlying causes, it is hoped they may work more intelligently with the physician, not without him."

The volume closes with a section devoted to the dental care of the child, some useful therapeutic measures applicable to the child, various food preparations and food values and some miscellaneous matter such as the treatment of poisons and the overcoming of objectionable habits.

A TEXT BOOK ON MINOR SURGERY, by *John C. Vaughan, M. D., director and visiting surgeon, Beekman Street Hospital; visiting surgeon Sing Sing Prison Hospital; consulting surgeon Manhattan Eye and Ear Hospital; and Athel C. Burnham, M. D., colonel in the United States Army, in charge of the medical department of the Red Cross in Poland, attending surgeon, Volunteer Hospital, New York, etc.* Lea and Febiger, Philadelphia, Pa., 1922.

In this book the writers have endeavored to give to the reader those minor surgical procedures which they have found to be simple and efficient in their work in some of the large dispensaries in New York. Many of the methods cited reflect in a large measure the surgical experience of the late war so far as it may be applied to ambulatory surgical practice, although many of the recent surgical developments do not receive the prominence they deserve. The book is excellent in parts and should be of great value to medical students, especially if used in conjunction with one of the standard textbooks on general surgery. Those surgical conditions most often seen in dispensary or office practice, such as infected wounds, sprains, fractures and dislocations, bursitis, leg ulcers, cellulitis, and abscess of the hand, are adequately presented. There are excellent chapters on bandaging, local anesthesia, certain special minor operations, surgical technic, and supplies.

The volume is well bound, the print is large, the paper of good quality, and the illustrations are numerous, instructive, and, for the most part, are photographic reproductions of cases occurring in the authors' practice.

The book's weak point seems to be a lack of detail in the consideration of some of the surgical conditions mentioned, such as erysipelas, etc., making reference to a larger work necessary if the student is to gain an adequate conception of the condition or if the general practitioner is to get the details of treatment advocated for the condition.

DISEASES OF THE EAR, NOSE, AND THROAT, by *Wendell C. Phillips, M. D., professor of otology, New York Post-Graduate Medical School and Hospital; surgeon to the Manhattan Eye, Ear, and Throat Hospital, New York.* Sixth revised edition. F. A. Davis Co., Philadelphia, 1922.

The fact that six editions of this book have appeared in 11 years testifies as to its popularity. It has been written to meet the needs of the general practitioner as well as the specialist, and for this reason the author has "purposely refrained from perpetuating discarded theories or descriptions of operations which are either obsolete or have been superseded by more modern methods, simply for the purpose of completing the record or to conform to the older textbooks." Nor has he "introduced modern theories or operations unless they possess a reasonable measure of scientific value." In conformity

with this plan we note in the latest edition that he has eliminated the descriptions and illustrations of the Asch, Roe, and Gleason operations upon the nasal septum which now must be considered obsolete.

The subject matter is handled in three parts, the first of which treats of the ear. In the second part the author discusses the influence of general diseases upon the ear, nose, and throat; while the third part is devoted to the nose and accessory sinuses, the pharynx and fauces, and the larynx. In view of the fact that the author has devoted over 30 years to the practice of otology, it is not surprising to note that half of the volume is devoted to a consideration of the diseases of the ear.

The chapter on the various tests for hearing is of special interest to the naval medical officer. In it the author emphasizes the inaccuracy of the watch test and voice test. He advocates the use of the Politzer acoumeter, which when, properly constructed, produces a fixed tone of equal pitch and amplitude. Unfortunately the instrument makers do not always construct these instruments according to the rules laid down by Politzer. The chapter on the general therapy of ear diseases is especially worth while. The diseases of the middle ear and the infections of the mastoid process with their complicating lesions are admirably presented and their treatment is clearly outlined.

In a chapter devoted to the diseases of the perceptive apparatus the author discusses otosclerosis, which is fairly common, characterized by progressive deafness, and is due to bony changes, particularly in the labyrinthine capsule and around the oval window, eventually resulting in an involvement of the annular ligament, and finally in an ankylosis of the foot plates of the stapes.

A comprehensive knowledge of the deleterious effects which general diseases and local organic affections may produce upon the ear, nose, and throat is indispensable in determining the diagnosis, prognosis, and treatment of the local manifestations within these organs. Recognizing this fact, the author has given considerable space to a consideration of the effects, especially of tuberculosis, syphilis, diphtheria, scarlet fever, and measles, on these organs.

In the section on the nose one is pleased to note many pages devoted to the various phases of rhinitis, the successful treatment of which brings satisfaction not only to the patient but to the physician. The steps of the various operations on the nasal septum, the turbinate bones, and the nasal accessory sinuses are clearly described.

The author emphasizes the importance of the proper removal of adenoids and tonsils. He gives prominence to the removal of the tonsil under a general anesthetic by means of dissection and a snare.

A chapter on the neoplasms of the larynx is followed by one on the neuroses of that organ. Several chapters on laryngoscopy, bronchoscopy, and esophagoscopy complete the volume.

One can not properly leave this book without calling attention to the numerous excellent illustrations which are scattered throughout its pages. Office equipment and instruments, methods of procedure, normal conditions and pathological processes are indicated by photographic reproductions, colored plates, drawings, and radiographs.

A MANUAL OF DISEASES OF THE NOSE AND THROAT, by *C. S. Coakley, A. M., M. D., F. A. C. S.*, professor of laryngology and otology in the College of Physicians and Surgeons, Columbia University. Sixth Edition. Lea & Febiger, Philadelphia, 1922.

Those who became familiar with this popular manual in their student days will welcome the appearance of the new edition as they would welcome an old friend to the comfort of their library fireside. In its present form it is still the compact handy book as designed by its author some years ago to answer the needs of both students and practitioners. The book has always been popular with students because of its clear description of the various methods of examination, diagnosis, and treatment.

In the preparation of the new edition much revision has been necessary. We note a new chapter on the diseases of the nasal vestibule and new articles upon such subjects as sinusitis in children, Vincent's angina, parapharyngeal abscess, and the direct examination of the upper air and food passages. The author has taken advantage of the opportunity afforded by the revision to include the newer remedies and to present the improved application of the older ones.

THE PRACTICE OF SURGERY, by *Russell Howard, C. B. E., M. S. (Lond.), F. R. C. S. (Eng.)*, surgeon, London Hospital; senior surgeon, Poplar Hospital; lecturer on surgery and teacher of operative surgery, London Hospital Medical College. Third Edition. J. B. Lippincott Co., Philadelphia, 1922.

This work as originally planned embodied, as far as is possible in a text book, the author's surgical teaching in the London Hospital Medical College. In the preparation of the third edition the book has been brought up to date without departing from the original idea of presenting general surgery as taught and practiced at the London Hospital. The subject is adequately covered and one notes that the knowledge gained by surgical experience in the World War has been incorporated in the new edition. The volume is well illustrated, and of special interest are the pictures of specimens in the museum of the London Hospital Medical College which the author has used to elucidate the text.

Considering the book as one written primarily for the medical student, it compares favorably with the best books of this type written by American surgeons.

GENERALIZED PAIN, by *Prof. Norbert Ortner, chief of the second medical clinic at the University of Vienna. Translated into English from the second and latest German edition by Francis J. Rebman.* Rebman Co., New York, 1922.

In the United States Naval Medical Bulletin of July, 1922, there appeared a notice of Professor Ortner's book on Abdominal Pain which formed Part I of his work on Clinical Symptomatology of Internal Diseases. Part II comes to us as a volume devoted to a consideration of the various phases of generalized pain. The plan of the volume on Abdominal Pain has been followed and we find the discussions of the painful sensations arising in portions of the body outside of the abdominal cavity admirably presented. The author deals with pains in the heart and in the cardiac region, in the sacrum, in the shoulder, in the neck, in the back, in the chest, in the extremities, in muscles, bones, and joints. Much space is devoted to a consideration of headache. Two volumes cover quite fully the subject of pain, and should form handy additions to the physician's library.

DENTAL AND ORAL RADIOGRAPHY, by *J. D. McCoy, D. D. S., professor of orthodontia and radiography, College of Dentistry, University of Southern California.* Third edition. C. V. Mosby Co., St. Louis, Mo., 1922.

This book, slightly enlarged, comes to us in its third edition. Primarily it is intended as a textbook for students, and consequently the more important points have been dealt with to a lesser degree. Still it is comprehensive enough to meet the requirements of the more experienced man who feels the need of a reference book.

Briefly and concisely, the author takes up in sequence the history of the X ray, electro-physics involved in producing the X ray, X-ray machines, tubes and tube technic, requisites of dental X-ray laboratory, technic of dental and oral radiography, development of plates and films, interpretation of radiograms, instructions for X-ray in dentistry, and X-ray changes and protection.

While no extensive changes have been made, the chapter on the interpretation of dental and oral radiograms has been carefully rewritten, and the teachings involved are distinctly conservative in nature. This is commendable in view of a tendency to base diagnosis entirely on X-ray findings rather than associate it with clinical symptoms. A feature of this chapter is an effort on the part of the author to establish a definite basis for interpretation of dental radiograms. The text matter is simple and descriptive. It is well arranged and a credit to the publishers. It may be commended to the profession as largely fulfilling its object as a textbook.

GENERAL AND PROFESSIONAL BIOLOGY WITH SPECIAL REFERENCE TO MAN, by Edward J. Menge, Ph. D., director of the department of zoology, Marquette University. The Bruce Publishing Co., Milwaukee, Wis., 1922.

This book, according to the author, contains all that is needed for two complete years of biological work in a premedical course. The premedical or predental student will find it useful, as in it will be found the basic principles of histology, neurology, and medical zoology which, if thoroughly mastered during the preliminary years, will be of greatest assistance to the student in his professional course.

The subject is comprehensively and logically presented in three parts, the first of which deals with general biology. In this section the author devotes a few worth-while chapters to the subject of study and the coordination of the subject studied. He begins the discussion of general biology with a consideration of the frog in detail.

The chapters on the frog are followed by several on the protozoa. One inclined to be hypercritical might question the accuracy of some of the statements in this section, but any one writing on the protozoa these days, if he is not extremely careful, will expose himself to criticism, especially when it comes to the question of nomenclature.

For instance, the author uses the term *Spirochaeta recurrentis* as the correct name of the organism causing relapsing fever, an organism which in our student days bore the name *Spirochaeta obermeieri*. As we know, there is only one correct scientific name for an animal and there are certain rules governing the naming of animals. Of these the law of priority provides that the oldest published name of any genus or species is its proper zoological name.

Regarding the name of the organism causing relapsing fever, one may read in the fourth edition of Stitt's *Diagnosis and Treatment of Tropical Diseases* that the generic name *Spirochaeta* not being properly available for this organism, Noguchi in 1918 proposed the name of *Spironema*, but this was found to have been used in 1864 by Meek for a genus of molluscs and by Klebs in 1872 for a genus of flagellates. In November, 1907, Sambon proposed the name *Spiroschaudinnia* for the blood spirochaetes, and this name would seem the proper one were it not for the fact that in July, 1907, Swellengrebel proposed the name *Borrelia* for the group of organisms of which *B. gallinarum* was the genotype. Sambon's "classification in which he used *spiroschaudinnia* for blood spirochaetes was presented in a paper read before the British Medical Association in July, 1907, but as it was not published until November, 1907, this is the time of priority. It is the publication in an acceptable journal and not the time a paper is read that gives basis for priority." Hence, according to the International Code of Nomenclature, the correct name of the organism causing relapsing fever is *Borrelia recurrentis*.

The author's discussion of the frog and the protozoa is followed by a chapter devoted to interpretations of the facts thus far presented to the student. Chapters on genetics, animal psychology, bacteria and immunity, yeasts, fungi, and the higher structures of the plant world, those aquatic animals known as the coelenterata, the worms, anthropoda, insects, especially the grasshopper and the honey bee, paleontology, evolution, and biological classification follow in order. A delightful chapter on the history of biology, illustrated by portraits of men who have attained eminence in this study, adds interest to this section of the book.

Part two deals with introductory embryology, the chick, frog, and mammalian embryo being considered. Part three is devoted to a study of a comparative anatomy.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

VITAL STATISTICS—METHODS USED IN THE UNITED STATES NAVY.¹

Ask a statistician to define epidemiology and he will tell you it is the statistical study of disease; ask a laboratory man and you will realize probably that he believes the answer is laboratory investigation of disease. Both are right, but neither is entirely correct. In any event the importance of vital statistics to the practice of preventive medicine can not be overstated. Without the statistical method comparatively little progress would have been made in epidemiology and less toward the prevention and control of disease.

Statistical method.—*The statistical method* is the method of presenting facts in numerical form in order that they may be studied in comparison with other facts, numerically stated or otherwise.

Vital statistics.—Numerical presentation of facts relating to sickness, deaths, births, and marriages for the population (or complement) as a whole, or for specified groups or classes. Vital statistics are commonly prepared specifically for the following population groups or classes:

Sex.

Age group.

Race and color.

Occupational group.

Statistics may be prepared for subgroups of these; for instance, whites of the male sex, belonging to the age group 20 to 29. Furthermore, it may be that only males of a particular occupational class are under consideration.

Graphic methods for presenting statistics.—Although statistics present facts for study in the form of numerals, their significance can not always be grasped until the statistical facts have been further

¹ Reprinted from Bulletin No 95, "Notes on Preventive Medicine for Medical Officers, United States Navy," upon request of many medical officers.

presented in graphic form—curves, lines, bar charts, spot-pin maps, pin charts, etc.

Graphic records are constantly necessary in statistical work for the following reasons:

(1) They make it possible to perceive instantly facts which otherwise might be concealed or discovered only after careful study.

(2) They make it possible to place before the eye at one time, in understandable form, information which otherwise could not be presented without long tables of figures accompanied by long and involved explanation.

(3) They facilitate comparison of facts with other facts, closely correlated, remotely related, or, perhaps, as determined by study, bearing no relation whatever.

(4) By their means it is possible at times to make a person untrained in the statistical method perceive certain facts and appreciate their significance when by other means he could not be made to understand.

(5) Either the relation or the possible relation of one set of facts to another set of facts, and still other facts may be recorded pictorially on a single chart or map.

(6) In conjunction with the records for previous corresponding periods of time, graphic records show the trend of current events and sometimes enable one to look into the future for a short distance.

In administrative work the routine use of graphic records insures that important information which might otherwise be buried in the files and forgotten will be kept in view. Frequently such records can be used to advantage in attempting to convince other persons of the necessity for certain preventive measures.

Subject matter of the vital statistics of the Navy.—In the Navy vital statistics are limited almost exclusively to morbidity statistics and mortality statistics. In a few instances—Virgin Islands, Guam, Samoa—birth and marriage statistics are collected for the civilian population.

The subject matter of vital statistics of the Navy is composed of—

1. *Basic data.*—(a) Individual morbidity reports, i. e., the Form F card, which shows the diagnosis and certain attending circumstances for each admission to the sick list. (b) Individual mortality reports; the death certificate, Form N.

2. Summarized written or telegraphic reports of new cases and deaths.

3. Compilations, i. e., tables or tabulations showing cases, deaths, or rates.

4. Graphic charts, spot maps, or charts posted by means of colored spot pins.

Correct vital statistics depend upon the accuracy and completeness of the basic data. Morbidity returns are incomplete when mild cases of a disease are not reported, and incorrect when erroneous diagnoses are recorded. A morbidity report is incomplete when any of the data required on the form is omitted. Mortality reports are incomplete when any of the required data are omitted, and incorrect when sufficient collateral evidence to insure correct classification of the death with regard to cause is missing. The death certificate must also contain the necessary information to enable the bureau to charge the death to the station or ship where the disease or injury resulting in death was acquired, and not to the place where death occurred—in a naval hospital, perhaps.

Purpose of vital statistics.—The immediate and most important purpose, from the standpoint of preventive medicine, is to furnish information as to when, where, and under what circumstances, disease is occurring. It follows, therefore, that morbidity and mortality reports should invariably be made as promptly as possible. Reports should be forwarded promptly as a matter of routine even when, from the local viewpoint, no apparent reason for haste exists.

The historical value of vital statistics is also very great. Complete statistics must be prepared for each calendar year.

Use of vital statistics.—Alone, vital statistics do not necessarily prove anything. The facts thus presented in arithmetical form may or may not comprise all the facts pertaining to the question under consideration—almost invariably not. All epidemiological factors which may possibly have a bearing on the question must be taken into consideration.

It is because of positive but unwarranted assertions based on statistics, by persons who fail to observe proper limitations, owing to lack of thorough training in the statistical method, that uninformed or misinformed persons not infrequently question the value of the statistical method in general, and of any statistics in particular that may be invoked in perfectly logical support of a given contention.

The answer to the old saying, "There are two kinds of lies, ordinary lies and statistics," is, "Figures do not lie, but, unfortunately, liars do make use of figures."

The idea of comparison is always involved in statistics. The user may not always be conscious of this, but everything in the universe is relative to something else, and if any given statistical statement appears to be absolute it is merely because it is unconsciously interpreted and weighed in association with similar information previously acquired. More frequently in practice the attempt is frankly made to compare the statistical information under consideration with other statistical data, and often with information of a different character as well.

Standards of comparison.—In order that any fact or set of statistical facts may be honestly compared with other facts in the realm of vital statistics they must all be expressed in the same ratio to population or group in the population.

The ratio itself does not matter; that is, the rate may be per 100 per 1,000, per 100,000, or per 1,000,000 of population, as best suits the purpose. To change a rate per 100 to the equivalent rate per 1,000 is a simple matter of sliding the decimal point over one place to the right. Rates per 1,000 are used for most purposes.

To make satisfactory comparisons we should have available standard rates, "norms" so called. The rate for a whole previous year, or preferably the mean rate for a series of previous years, is used for this purpose. Ordinarily figures should not be used for more than the five-year period immediately preceding. Conditions tend to change, and circumstances may not permit true comparison with figures relating to a more remote period. There are certain exceptions to this rule. For example, it may be desired to show a death rate, by years, for a long period of time.

In studying the rate from a given condition for a season of the year, a certain month, for instance, the similar rates for the corresponding month of previous years should be available, although very likely we will also compare it with the average whole-year rate.

As a rule, morbidity and mortality rates are computed for current study by weeks, by months, and by years; occasionally by 5-year or 10-year periods. Exceptionally, as for an epidemic of influenza, morbidity and mortality rates are computed by days in order that a more complete statistical analysis of the outbreak may be made.

Rates for weeks or for months or other short periods of time fluctuate widely. The weekly rate is almost sure to vary a great deal from week to week. Because of this the fairest available whole year rate should always be borne in mind.

Naturally it follows that the rate for the week or other short-time period must be expressed in terms of an annual rate in order to facilitate comparison. This is done as follows: The number of cases (or deaths) for the week is multiplied by 52 and the rate is then computed. This rate is called the *annual rate for the week*. We merely assume that if conditions were exactly the same for the other 51 weeks the whole-year rate would be that figure.

It is our practice to express all rates as annual rates, whether for a week, month, whole year, or longer period. In this way any rate may be compared directly with standard rates or with rates for any other period of time, shorter or longer, or with regard to season of the year, corresponding or different period.

Population statistics.—It is clear that we must have accurate or nearly accurate population (complement) figures in order to compute

approximately correct rates. In civil practice the estimated mid-year population as of July 1 is taken.

In the Navy the daily average complement for the period under consideration is used. This is determined by taking the total number of daily rations issued and commuted during the period (figures obtainable from the supply department). This figure is divided by the number of days in the period and then the number of officers and others not entitled to rations is added.

The larger the complement the smaller the error caused in a rate by incorrect complement figures. In any event the omission or addition of one case (or death) will have more effect on the rate than a considerable variation in the complement.

Annual rates.—An annual rate per thousand is obtained for a definite period of time—a week, month, quarter, or entire year—by multiplying the number of deaths or admissions for the given period by 365 and dividing by the number of days in the period; this figure is then multiplied by 1,000 and divided by the average daily complement. The cases (or deaths) for a week may be multiplied by 52; for a month by 12.

The rate for the entire year, of course, is an annual rate. It is computed simply by multiplying the number of cases (or deaths) which have occurred during the year by 1,000 and dividing by the daily average complement for the whole year.

Provisional rates and final rates.—Morbidity and mortality rates computed from week to week or from month to month must of necessity be provisional rates based upon reports as received for the period in question. Final rates ordinarily are not prepared until after the end of the year when final returns have been received. Then the figures may be reviewed and corrections made in weekly or monthly rates by excluding cases (or deaths) which did not actually occur in a given period, and by charging them to the week or month in which they did occur. (In civil practice, in revising death rates, corrections are sometimes made for deaths occurring in the community but chargeable elsewhere.)

Current morbidity and mortality rates are prepared as a matter of routine in order that the incidence, distribution, and severity of disease may be determined for comparison with similar figures for past periods and other communities.

It must be borne in mind that rates for short periods of time—weekly and monthly rates—fluctuate widely because of epidemic conditions, seasonal and other periodic or cyclic influences, and fortuitous circumstances. Such rates should always be compared with similar rates for corresponding periods of past years, although rates for past whole years furnish a guide as to what may be re-

garded as a normal average, seasonal and other influences, of course, being taken into consideration.

Comparison between one naval station and another, or between ships, and especially between ships and stations, should not be made without taking into consideration a number of conditions which may vary widely—number of personnel, density of population, overcrowding, housing conditions, permanency and character of the personnel, nature of activities carried on, environment, geographical location, climate, and season.

In the Bureau of Medicine and Surgery provisional annual morbidity rates are computed and plotted on charts each week for the Navy as a whole and for shore stations, separately and combined. Separate rates are plotted for the classifications "All causes," "Diseases only," communicable diseases as a class, venereal diseases as a class, and for each of the important communicable diseases.

The general death rate of the Navy for "All causes" and the rate for "Diseases only" are computed every Monday from certificates of death (Form N) received during the preceding week.

Rates other than those expressed in terms of annual rates.—*Epidemic rate.*—Epidemic morbidity rate. Epidemic mortality rate. Computed simply as the rate per thousand of complement attacked or died as a result of the epidemic, regardless of its length.

Attack rate.—Sometimes used to indicate the incidence of a disease among those presumed or known to have been exposed. Generally expressed as the percentage of cases occurring among contracts. With regard to influenza, it is permissible to conclude that practically everybody in the community has been exposed if the disease is epidemic.

Case fatality rate.—Percentage of fatal cases among persons attacked by a given disease. Computed by multiplying the number of deaths by 100 and dividing by the total number of cases, fatal cases included.

To express this, medical officers frequently use other terms, such as "mortality," "mortality rate," or "death rate." The objection to use of the expression "mortality" is that it is not always clear that the case fatality rate is meant. The other terms have entirely different meaning, viz, the ratio of deaths to the population or some group in the population.

Percentage of sick.—This rate expresses the daily average percentage of men on the sick list, for the given cause or causes, during the stated period. It is sometimes called the *noneffective rate*, because when all causes are included it indicates the percentage of complement constantly noneffective during the stated period.

To compute the percentage of sick for a given disease it is necessary to know the number of sick days. This figure divided by the

number of days in the period gives the daily average number of patients on the sick list with the given disease. This number is multiplied by 100 and divided by the daily average complement.

This rate is of little value from the standpoint of prevention, but it is of interest from an economic point of view, and thus becomes of interest from the broad standpoint of preventive medicine, as well as general medicine. For the service as a whole the percentage of sick, as calculated at the close of the year upon receipt of final returns, gives definite information as to the percentage of men constantly off duty as a result of disability from any one or all causes.

For example, the percentage of sick, entire Navy, for the calendar year 1917, was 2.18. Suppose a working strength of not less than 500,000 men were required; on the basis of 2.18 per cent constantly noneffective, the total strength must be not less than 510,900.

The percentage of sick for an individual ship or station may be very misleading. It does not give definite information as to the incidence and prevalence of disease—for *this purpose we must have the numbers of new cases and deaths*. A few patients treated on board may lead to a high percentage of sick; on the other hand, the percentage of sick may remain low in spite of a large number of admissions to the sick list if patients are transferred immediately. For example, consider two ships, each having a complement of 1,000 men; each admits to the sick list during the month 10 cases of gonorrhea (annual admission rate for the month, 120 per thousand), but in one ship all cases are treated on board with the result that 52 sick days chargeable to gonorrhea occur in that month, resulting in 0.173 per cent of sick due to that disease. In the other ship, let us assume, all cases that are not admitted for record only, with no sick days, are transferred on the day of admission, resulting in no sick days, and consequently zero percentage of sick for the month chargeable to gonorrhea.

It is obvious that a comparatively high percentage of sick does not necessarily constitute a discreditable showing, and that a low percentage does not necessarily indicate a low incidence of disease.

Minimum rate.—The lowest rate in a series of rates.

Maximum rate.—The highest rate in a series of rates.

Median rate.—The rate which stands in a series half way between the minimum and maximum rates.

The mode (modal rate).—The rate which occurs in the series with the greatest frequency. In some series the mode is not apparent.

The items of a series arranged in order from the minimum to the maximum figure are said to have been placed in *array*.

Mean rate.—The average rate independently computed from the combined basic data included in the series—not the average of the rates.

Example: Communicable diseases, exclusive of influenza and venereal diseases, at the Naval Training Station, Newport, R. I., first quarter of 1920:

Month.	Average daily complement.	Cases.	Annual rate per 1,000.
January.....	2,540	6	28.35
February.....	2,794	23	98.78
March.....	3,267	41	150.60

The mean annual rate for the quarter is 97.65 (obtained as follows: 70 cases multiplied by 4, then by 1,000, and divided by the average daily complement for the quarter, 2,867).

Average of the rates.—In the above example the average of the rates is 92.58. The discrepancy is obvious. In rough calculations it is often sufficient to take the average of a series of rates, but the figure thus obtained must not be regarded as the mean rate. See *Weighted and unweighted averages*.

Combined rate.—The average rate for two or more communities—not the average of the rates.

Example: Death rate from disease, entire Navy, April, 1920:

	Navy.	Marine Corps.	Entire Navy.
Average daily complement for the month.....	114,543	16,478	131,021
Deaths from disease.....	43	12	55
Annual death rate per 1,000 for the month.....	4.50	8.74	5.04

The combined rate is, therefore, 5.04. Clearly, it would not be proper to take the average of the rates, 7.17, as the death rate of the entire Navy. If that were done, undue weight would be given to the comparatively small complement of the Marine Corps and not enough to the relatively large complement of the rest of the Navy. If the complements were equal the combined rate and the average of the rates would agree. This would also hold for a series embracing more than two items if the complements were all equal.

Other terms used in statistical work.—*Series of data.*—The items of a series may be either rates or basic statistical data (cases or deaths).

Geographical series.—The items in the series represent ships, stations, or other places.

Historical series.—The items in the series refer to time periods, each series representing a single place.

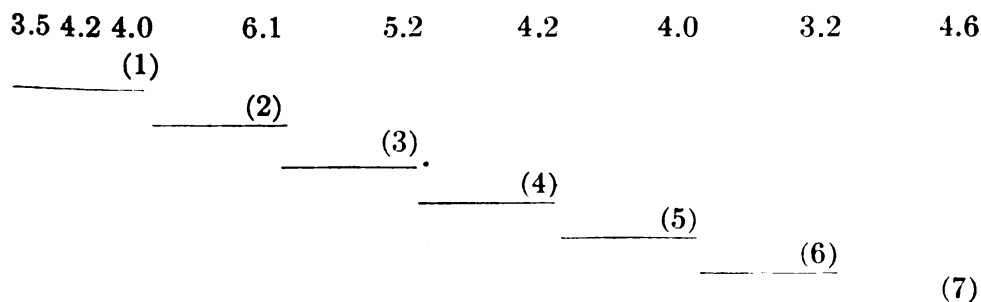
Weighted and unweighted averages.—If the arithmetical averages of two or more series are added together and divided by the number of series the average thus obtained is an unweighted average. It is an average of averages and does not give due weight to differences in

complement. Example, an average of the rates instead of a properly computed mean or combined rate as described above.

Likewise, in dealing with cases or deaths directly, care must be exercised not to take an average of averages or the result will not be a properly weighted average; especially should comparison be avoided between unweighted averages for a series of places, or time periods, and a weighted average for another series.

Moving average.—This is calculated as a series of averages moving along, so to speak, through a series of rates. The moving average is most useful where the rates are to be plotted as a curve representing a great many time periods in unbroken sequence, especially when there is reason to believe that the fluctuations observed in the individual rates are largely due to periodic or cyclic influences. Suppose we have the death rate by years for a given place plotted on a chart as a curve extending over a long period. There will be fluctuations from year to year, of course. If we plot a curve for successive five-year averages, say, instead of by single years, the fluctuations, to be sure, will be smoothed out to a considerable extent, but the effect of unusually high or low rates will be merged in each separate five-year average and the tendency will be to conceal any periodic effect on the rate that is due to cyclic phenomena which periodically recur, such as epidemics of influenza, measles, unusually bad winters, etc.

Now, we can plot a curve from *moving averages* that will smooth out fluctuating rates and yet preserve in the comparatively smooth curve the influence of regularly recurring fluctuations. Best explained by an example. Suppose we had the following series of rates: 3.5, 4.2, 4.0, 6.1, 5.2, 4.2, 4.0, 3.2, 4.6, 4.2, and perhaps a longer series. To plot a moving average curve on a 3-year pivot (3-year moving average) we would proceed as follows: The average for the first three rates, 3.5, 4.2, 4.0, is taken and plotted under the 4.0 rate as the first moving average plot point. The next moving average point is obtained from the rates 4.2, 4.0, 6.1; the next from 4.0, 6.1, 5.2, and so on, dropping a rate and taking up the next in the series for each new moving average point. The following diagram illustrates this. The figures in parentheses refer to the position on the chart of the first, second, third moving average plot point, etc.



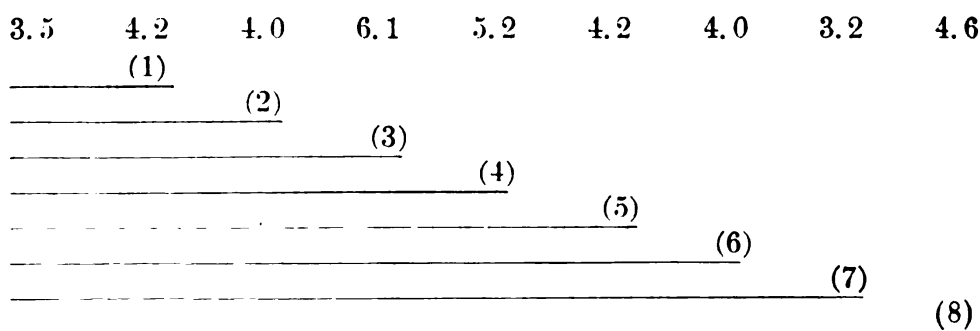
The moving average period may be taken as 5 years, 7 years, 10 years, or other pivot number. The closer the period chosen approximates the periodicity of recurring phenomena the better their influence will be brought out. It is sometimes desirable to try two or three moving average periods to see which works out best.

The question sometimes arises as to whether the first moving average plot point should be set back. For instance, in a long series of monthly rates the moving average is to be calculated on moving average periods of 12 months; strictly speaking, the first moving average plot point falls on the date of the twelfth month, but it is usually permissible to antedate it to the sixth month, in which case half of the data from which it is calculated lies before and half behind it.

Progressive average.—This is a simple matter of plotting under each new rate in the series the averages of all preceding rates from the beginning of the series.

Suppose we are charting the death rate of the Navy by weeks from the first of the year. The rates fluctuate from week to week. The progressive average curve shows, each week, the average annual rate from the first of the year to date. Inasmuch as all rates are expressed as annual rates, the progressive average for the last week of the year actually is the annual rate for the year, subject, of course, to revision upon receipt of final returns.

Of course, the correct procedure is to compute the mean rate for each new progressive average point, but for ordinary purposes the average of the preceding rates is sufficiently accurate to show the trend of the curve, which is frequently so obscured by fluctuations that it can not be perceived without a progressive average curve, plotted along with the fluctuating curve. The following diagram shows the scheme. The figures in parentheses indicate the positions on the chart of the progressive average plot points.



Compilation of statistical data.—On board ship, or at a naval station, compilation is ordinarily a simple matter of counting up the total number of admissions to the sick list, or the number of admissions on account of certain diseases, deaths, and number of sick days. The

daily average complement must be determined in order that rates may be computed.

Where thousands of reports must be handled, as in the bureau, card-punching machines, sorting machines, adding machines, and machines for calculating rates are used.

Where a great many reports must be handled without machines, recourse to hand tally sheets must be had. The cross 5 method is usually employed; i. e., $\text{X} \text{X} \text{X} \text{X} \text{X}$. The cross 10-dot method is some-

times used: $\text{X} \cdot \text{X} \cdot \text{X} \cdot \text{X} \cdot \text{X}$.

Sheets of paper are ruled in accordance with the different combinations of data to be tallied from the individual reports.

From the figures thus obtained rates may be computed, and these may be presented for study on graphic charts in the form of curves plotted to scale, or as bars plotted or drawn to scale.

Before statistical data can be compiled they must be definitely classified, both with regard to the complement and type of disease. The complement is classified in accordance with the established ranks and ratings of the Navy, and composite groups such as recruits, fire-room force, deck force, officers, enlisted men, age groups, force ashore, force afloat, etc.

To make accurate classification of diseases possible, medical officers are required strictly to follow the Navy Nomenclature and Classification of Diseases, Injuries, and Poisons. This is divided into two parts: (a) The nomenclature, which is merely an alphabetical list of the acceptable names of diseases, and (b) classification. This is a composite classification based, in part, upon anatomical considerations, but in so far as the important communicable diseases are concerned, upon modes of transmission which have a more or less direct bearing on measures for their prevention and control. Therefore, when the medical officer is in doubt as to which of two diagnostic terms he should select, reference should be made to the classification table in order that the title selected will place the case in its proper class. Care must be used to select the title which actually fits the case. For example, the title, "cerebrospinal fever" is to be used when, in the judgment of the medical officer, the disease is probably meningococcus meningitis, even though meningococci have not been recovered by lumbar puncture or by nasopharyngeal swab. The term meningitis cerebrospinal means some other form of acute cerebrospinal meningitis-pneumococcus, streptococcus, etc., other than tuberculous meningitis.

Deaths are classified in the bureau in accordance with the International List of the Causes of Death.

For routine statistical study disabilities and deaths are broadly classed as follows:

1. All causes.
2. Diseases only.
3. Accidents and injuries, including poisons.
4. Accidents and injuries.
5. Drowning.
6. Communicable diseases, exclusive of venereal diseases, influenza, tonsillitis, and minor infections of the respiratory tract.
7. Each of the more important communicable diseases separately: Cerebrospinal fever, chicken pox, diphtheria, influenza, malaria, measles, mumps, pneumonia-primary broncho, pneumonia lobar, scarlet fever, smallpox, tuberculosis (all forms).
8. Venereal diseases as a class.
9. Gonococcus infection, syphilis, and chancroidal infection, separately.

The figures for any special grouping of diseases can be obtained quickly in the bureau by means of sorting machines. The groups mentioned above are used as a matter of routine, and rates are also computed weekly for each of the 26 classes of the Navy nomenclature classification.

Summary of rates used in presenting morbidity and mortality statistics.

Morbidity rates:

General morbidity rates (rates expressed in terms of the whole complement without regard to sex, age, race, or occupational group).	For all causes.
	For a given disease.
Specific morbidity rates (rates for specified groups or classes in the complement, as age group, race, or occupational group).	For a class of diseases.
	For all causes.
	For a given disease.
	For a class of diseases.

Mortality rates:

General death rates (rates expressed in terms of the whole complement without regard to sex, age, race, or occupational group).	For all causes (this is the <i>crude death rate</i>).
	For a given disease.
Specific death rates (rates for specified groups or classes in the complement, as age group, race, or occupational group).	For a class of diseases.
	For all causes.
	For a given disease.
	For a class of diseases.

Interpretation of vital statistics.—It is the main purpose of vital statistics to establish relationship between different facts relating to sickness and death. Such relationship is termed correlation. The underlying purpose, of course, is to determine cause and effect. This brings us at once into the domain of logic.

Cause of an event.—The circumstances which *must* have preceded in order that the event should happen (Jevons; *Lessons in Logic*).

An event seldom has a single cause. *Statistics do not in themselves establish cause.* However, the first step is to prove the existence of correlation, and this may be accomplished by the statistical method.

Correlation.—Correlation may be simple or complex.

Primary or simple correlation (direct comparison).—Two series of data only are compared. Example: Death rates from pneumonia set forth by months, to determine correlation between pneumonia mortality and season of the year.

From the statistical standpoint epidemiological data are known as variables. In any given problem one of the variables is always used to interpret or measure the other data. This one is termed the *independent variable*. In the above example the death rates are measured by months; months, therefore, constitute the independent variable.

Almost without exception, when time periods constitute one of the variables, it is the independent variable. The same is true of classifications such as sex, age groups, races, occupational groups, etc.

The data to be measured are termed *dependent variables*. Numbers of cases, deaths, morbidity and mortality rates, percentages of all sorts of things, bacterial counts, gallons, cubic feet of water, and similar data expressed in varying or fluctuating numbers naturally constitute dependent variables.

On a chart the horizontal scale should always be used to show the independent variable and the fluctuating dependent variable should be plotted to the vertical scale (the numerical scale).

When correlation is definitely established between *two* series of data a casual relationship is thereby demonstrated *provided connection between the variables can also be established*. Connection is not shown by statistics alone. *Casual relationship does not necessarily mean the only cause.*

Secondary or indirect correlation.—Three or more series of data are compared; data not obtainable in comparable form for direct comparison. The processes of logic are more complicated in such instances, and the liability to arrive at an erroneous conclusion is greater.

We must bear in mind the mathematical proposition that two things which equal a third are equal to each other, but it must also be remembered in statistical work that *two series of data which vary closely with a third may not bear a casual relation, or, indeed, any relation whatever to each other.*

Example involving secondary correlation.—An epidemic of cerebrospinal fever at the Naval Training Station, Great Lakes, Ill., epidemiological factors:

Number, frequency, and distribution of the cases.

Number and distribution of carriers.

Length of service of those attacked.

Housing conditions.

Month of the year and weather conditions.

Personal hygiene of those attacked.

Fatigue, worry, and exposure to other predisposing influences.

Prevalence of other diseases.

It is only by establishing direct and indirect correlation between the incidence of the disease and these factors (and any other factors which seem to have a bearing) that the whole truth about the outbreak can be determined.

Experience during the war showed that there was low correlation between cases and carriers but that a high degree of correlation existed between the incidence of the disease and certain combinations of the other factors which in turn were closely correlated with each other.

Methods of demonstrating correlation.—(a) By graphic charts, comparison of curves or bars.

(b) By mathematical formulæ involving the use of coefficients.

Demonstration of cause or causal relationship.—1. The *synthetic method of proof*, by which known particular facts are pieced together in order to reach a more general conclusion. This is the inductive method of reasoning.

There must be agreement between the facts which are to be accumulated. It is, therefore, sometimes called the method of agreement. The following rules are applicable to the synthetic method of proof:

(a) Rule of agreement: If certain instances of the phenomenon in question have only one circumstance in common, that circumstance is the cause of the phenomenon (or the effect, depending upon the proposition.)

(b) Rule of difference: When the phenomenon in question occurs in one instance and is absent in another, and one circumstance only is missing in the latter instance, all other circumstances being in agreement, then that one circumstance is the cause or an inseparable part of the cause of the phenomenon (or effect, depending upon the nature of the proposition).

(c) Rule of combined agreement and difference: When the phenomenon in question occurs in two or more instances and is absent in other instances, if there is one circumstance common to all instances in which the phenomenon does occur, and all instances in which the phenomenon is absent have nothing in common but the absence of that circumstance, then that circumstance is the cause or an inseparable part of the cause of the phenomenon (or effect, depending upon the nature of the proposition).

In the synthetic method a few instances are not sufficient to establish proof. The larger the series the stronger the proof.

2. *The analytic method of proof.*—Deductive reasoning by which a proposition is asserted to be true after which the proof is sought in correct premises, and so on from one proposition to another until a known truth is reached and the main proposition proved. In other words, the mind looks ahead to the conclusion and then seeks to justify that conclusion by establishing correct premises for its logical proof. This method must be resorted to when it is not clear how to start the ordinary inductive method.

3. *The indirect method of proof.*—Logical process of reductio ad absurdum.

Fallacies and pitfalls.—There is always danger of unfair comparison of morbidity and mortality statistics for different places when consideration is not given to—

1. Comparative reliability of the basic data.
2. The accuracy with which the data for each place were compiled and the methods of computing rates.
3. Epidemiological influences—comparative effect of potent factors.
4. The danger of concealed classification.

There is always danger that statistical data which purport to convey certain definite information may be concealing classes such as sex, age, race, color, or particular occupation, which, if revealed, might cause a very different interpretation to be placed on the figures. For example, if we compare the incidence rates of pulmonary tuberculosis among employees in two different industries a conclusion that one may be more conducive to the development of the disease than the other may be fallacious, because the figures may conceal the fact that the majority of employees in one are very young, while in the other they are mostly persons beyond middle age. In the same way nationality or race may be concealed. Negroes in the United States have a high death rate from tuberculosis irrespective of occupation.

The following example illustrates the necessity for constant guard against the introduction of concealed facts. A very extensive experiment to determine the possible prophylactic value of pneumococcus vaccine was conducted in a series of large institutions, by vaccinating every other newcomer, leaving each alternate one as a control. Now, some of these upon arrival were in good physical condition; others, not. In cases of choice it practically worked out that an undue proportion of those who were not well to start with fell into the group of controls. For the first few months the death rate from pneumonia was much lower among those vaccinated. The figures concealed the fact that a higher proportion of those unvaccinated probably would have contracted and succumbed to pneumonia under any circumstances.

HEALTH CONDITIONS OF THE NAVY.

There has been little change in the health conditions of the Navy during the past four weeks; the annual admission rate for all causes for the four-week period ending March 3, 1923, was 810 per 1,000. However, morbidity rates were considerably lower in the last week of this period, the admission rate for that period being 650 per 1,000 per annum. This increased rate over the five-year norm rate was due largely to influenza, bronchitis, tonsillitis, and measles.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of February, 1923, in comparison with the mean annual admission rate, month of February, for the four-year period 1918-1921, inclusive:

	February, 1918-1921, inclusive.	February, 1923.
Cerebrospinal.....	0.4	0
Diphtheria.....	6.8	0
German measles.....	1.4	0.10
Influenza.....	164.9	122.87
Malaria.....	11.5	12.3
Measles.....	7.2	35.50
Mumps.....	40.9	11.94
Pneumonia.....	12.02	4.84
Scarlet fever.....	3.3	3.91
Smallpox.....	.3	0
Tuberculosis.....	4.4	2.9
Typhoid fever.....	.15	.31

It will be noted in the above table that the admission rate for influenza was not as high as the previous four-year norm rate. The admission rate for measles was excessively high—35.50 per 1,000 per annum as compared with the previous four-year norm of 7.2 per 1,000. Most of the measles cases occurred at the United States naval training station, Hampton Roads, Va., the United States naval training station, San Francisco, Calif., and aboard several ships, particularly those on the west coast. The admission rate for scarlet fever was also high—3.91 per 1,000 per annum. This disease has been prevalent at the United States naval training station, San Francisco, Calif., for some time, and occasional cases have also been reported from various ships of the fleet. At no place except San Francisco has scarlet fever occurred in epidemic form. The annual admission rate for malaria was 12.3 per 1,000, the majority of cases being reported from Santo Domingo and Haiti.

The incidence of venereal disease was somewhat lower for the four-week period ending March 3, 1923, than at any time within the past six months, the admission rate for this period being 112 per 1,000 per annum.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S. WYOMING FOR THE YEAR 1922.

Health records.—All members of the crew whose health records do not contain signed entries for successful vaccination or reaction of immunity are revaccinated and examined at the end of 24 hours, and again after 48 hours, if necessary. Of course, all men reporting on board are examined, their health records verified and completed, and the men vaccinated and given typhoid prophylaxis, unless their health records contain entries which appear reliable.

It is the practice to send out lists for men who are wanted for inspection. Upon reporting they are formed in line, and each man is given his health record to hold, and as he appears in turn before the medical officer he is required to verify the descriptive sheet, his arm is inspected and the vaccination abstract checked. If vaccination is required, it is performed at once and the date is entered in his health record and on the index card, which is held in the temporary file. The next day the man is again given his health record to present to the medical officer. If he shows an immunity reaction, the result is at once entered in his health record and signed, and his index card completed and placed in the permanent file. The same system is carried out in giving the antityphoid vaccine, and after the third inoculation the results are entered in the man's health record, and his index card signed and placed in the permanent file. Under this plan all chance of error is eliminated, and the man knows that the medical officer has signed his record.

In this connection it may be stated that many of the health records are found incomplete and poorly kept. The words "negative" and "positive" are still being used, and the frequent use of the rubber stamp makes this abstract sheet still more uncertain. It is believed that another circular letter on this subject to all naval medical officers might correct this common error in our health records.

Health conditions.—The health of the crew has been excellent during the year, except during the month of January and the last two weeks of December, when epidemics of influenza broke out in each case while the ship was at the Brooklyn Navy Yard. These epidemics quickly passed as the ship reached a warmer climate. Health conditions have been good in spite of serious overcrowding of the ship; overcrowding not only from public-health standards but also in comparison with the number of men the ship was designed to carry and the provisions for air supply in living compartments below decks. Messing, toilet, and bathing facilities are relatively very much restricted.

The above conditions are apparently of little importance so long as the ship is away from a liberty port, the weather is warm, and

there is no great prevalence of disease ashore, but they do constitute an epidemiological factor to be reckoned with when the weather is cold and the men are congregated below, especially as there are foci of infection on board. The present plan of keeping one-third of the crew on leave while the ship is in her home port for overhaul has lessened the danger, especially during the December overhaul period. Another factor that helps to prevent the spread of infectious diseases on board the modern battleship is that the ship is cut up into many small compartments and spaces below the main deck. On the U. S. S. *Wyoming* the crew sleep in practically 18 separate compartments on the gun deck, in 14 compartments on the berth deck, and in small numbers in offices, shops, turrets, and other places. Many men sleep on cots in passageways and in compartments, making a two-tier system of billeting the men. Therefore, it is believed that the danger of spreading direct-contact diseases is greater in the daytime than at night.

The air supply and the quality of the air varies in different parts of the ship, from excellent on the gun deck to very bad in the marine compartment and the chief petty officers' quarters. The poor quality of the air in the chief petty officers' quarters is due to overcrowding, but in the marine compartment it is due both to overcrowding and poor circulation of air. An exhaust blower has been recommended and should be installed in this compartment. During the summer months in the South, and at Guantanamo during the winter, the main deck of the ship is available for sleeping space and the danger and discomfort of overcrowding disappears.

Another epidemiological factor of importance on this ship is the constant change of personnel. The U. S. S. *Wyoming*, as flagship, acts as the distributor, for large drafts of men from training stations and receiving ships. These men are kept on board for varying lengths of time, and it has been necessary to guard carefully against the introduction and spread of disease. These drafts of new men from training stations and receiving ships also swell the ship's sick list.

The accident rate has been low, due to the installation of proper safety precautions and to the careful and thorough instructions given to the men. With few exceptions, injuries due to accidents have been trivial and due to carelessness, for in many cases the patients were old and trained in the ways of the service.

General preventive measures.—The ship has been maintained in an excellent state of cleanliness above and below decks. All bedding, including that of officers, is thoroughly sunned and aired weekly. Men whose work keeps them below decks are encouraged to spend sufficient time on deck in the open to keep in good physical condition.

The crew's mess gear, after washing, is sterilized by boiling after each meal. A reliable hospital corpsman is stationed in the scullery at this time to see that the water is boiling and that the mess gear is submerged for a given time. He makes a daily written report to the medical officer. Under this system no wiping cloths are used. Sterilization of mess gear is regarded as one of the most important general preventive measures employed on board ship, and would be carried out in the officers' and chief petty officers' messes if space in the pantries would permit.

All food handlers in the general mess are provided with aprons and caps.

Eradication of vermin.—The campaign against cockroaches, bedbugs, and rats is still in active operation. A sanitary squad, consisting of one hospital corpsman in charge with two men from the crew, has no other duty except to find and exterminate cockroaches and bedbugs, and to trap the rats. This squad kills on an average of from five to seven rats per week. A similar squad should be organized on every ship in the fleet, as it is the only way to keep the number of cockroaches, bedbugs, and rats to a minimum on board ship. The squad should be made up of picked men who are interested in the work.

A ship's laundry acts as a distributing center for bedbugs, and the sanitary squad is constantly on the watch here. Bedbugs are found from time to time. Every week the laundry is cleaned and live steam from a hose is directed into all cracks and crevices. All woodwork is steamed with special care and the cresol and kerosene mixture is liberally applied.

Skin diseases.—Many sick days due to various skin diseases are added while the ship is in southern waters during the winter months. Most of the conditions, as seen aboard ship, are due to a lack of personal hygiene and are therefore preventable. Furunculosis under the arms is a very common condition among the men of the engineer's force, and they have been advised to shave the hair from under the arms and to keep these surfaces clean, dry, and covered with talcum powder when off duty. This plan has been found to reduce the number of sick days among the men of this division by more than 50 per cent. Another exciting cause of many skin diseases is the unsterilized undergarments of the men. The crew wash their own clothes, and, while they are clean, they are never passed through boiling water. It would be a valuable preventive measure if the crew could have, at least, their underclothing washed and sterilized in the ship's laundry. The laundry is ample in size and equipment for this purpose, and the present laundry force appears to be capable of handling the work without detriment to the clothing of officers and chief petty officers.

A serious sanitary defect exists on board, because of the fact that there is not sufficient stowage space for each man to have his own bucket. Several men must use the same bucket for washing and bathing purposes.

Venereal disease.—The number of cases of venereal disease has been reduced from 163 in 1921 to 134 in 1922, and the number of sick days from 384 in 1921 to 97 in 1922. The main reduction was in the number of chancroid infections from 29 in 1921 to 7 in 1922. It is believed that the venereal prophylactic tube, with the present instructions to use before having coition, will materially reduce the number of cases of chancroid infections and of syphilis, but will not produce the same results with gonococcus infections on account of the apparent difficulty in carrying out the instructions properly. Efforts have been made to see that all members of the crew are aware of the serious complications and after-effects that may follow gonorrhea and syphilis. The pamphlets and circulars prepared in the Bureau of Medicine and Surgery have been widely distributed.

The venereal treatment room on board this ship is well equipped for medical prophylaxis, and is accessible day and night. Treatment is given under the direct supervision of a competent pharmacist's mate, who is especially qualified for the work. But prophylactic treatment, of any kind, is not popular with the average man, and he will not voluntarily take it in home ports. The number of treatments given greatly increases on foreign stations where local hazards are known to be great.

All cases of venereal disease discovered on board this ship are admitted to the sick list and discharged for record. All cases are given thorough treatment under close supervision of the medical officers, and those infected are restricted to the ship until all active manifestations have completely disappeared. No man with gonorrhea is released from treatment until he has a negative smear and his two-glass test shows both urines to be clear.

From experience gained on the Pacific coast, it is believed that the lowering of venereal disease rates on board ship depends principally upon the activities of public health officials, the police, and social hygiene workers of the community in which liberty is granted.

In the campaign waged in southern California, the officials broke up the red-light districts, closed the so-called coffee houses, and arrested, examined, and treated every infected prostitute. The venereal disease rates immediately dropped off at San Diego, San Pedro, and in the Pacific Fleet.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"CALIFORNIA" FOR THE YEAR 1922.

The high admission rate for measles and bronchitis during the year is, in part, due to the great number of men transferred to this ship for further assignment to other ships of the fleet. For instance, measles was brought aboard by the last draft of men received from the U. S. S. *Henderson*. Eight cases occurred among the men from the U. S. S. *Henderson* and four among the men of the ship's company. The men from the U. S. S. *Henderson* were distributed among the crew after a period of segregation of 14 days on the forecastle.

It seems that the period of training of most of these men had been curtailed on account of shortage of personnel of lower ratings in the fleet. This is to be deplored for several reasons, but principally because they have not had enough training to know how to take care of themselves. The initial inspection of the last draft of men showed a complete lack of personal cleanliness, due, according to the statements of these men, to lack of bathing facilities on board the transport. However, the men with some service who had been on the *Henderson* managed to keep themselves in a fair state of cleanliness. The lack of training showed markedly among the men of short service, which varied from six weeks to three months. This great influx of recruits to ships of the large type has a deterrent effect on their morale, as they can not get into the rigid routine of shipboard without a great deal of difficulty.

The physique of quite a number of the recently enlisted men was not up to the standard required by the Manual of the Medical Department. Much can be done to relieve the condition mentioned above by longer periods of training to weed out the mentally and physically infirm and by bettering the facilities on board the transports. All of the transports have come in for criticism from the men traveling around from the Atlantic coast. A remedy on this score is recommended.

The annual admission rate for venereal disease has been relatively low due to the intensive instructions given to the divisions each week by the medical officer. The amount of good resulting from the use of the prophylactic tube can not be estimated, although they have been used to a great extent.

The treatment of venereal disease patients is also intensive. All old cases of syphilis are put under a course of treatment three months of the year, which includes arsphenamine, potassium iodide, and the mercurials. A chart is kept of all treatment and checked weekly.

Whenever a skin lesion or itch of any sort appears all men of the division to which the patient belongs are inspected to prevent a general outbreak. Numerous scabies patients have shown up among men of the drafts received and these inspections have done much to keep this disease well in hand.

All cooks, butchers, mess cooks, and men handling food, as well as barbers, are inspected weekly for venereal disease and skin disease.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"TEXAS" FOR THE YEAR 1922.**

While at the Bremerton Navy Yard for overhaul, January to March, influenza, then widespread in the country, became epidemic in a mild form, 100 cases occurring among the personnel. Weather condition were favorable for its spread, for at this time of the year cold, wet, sunless days are almost continuous. The unfavorable living conditions on board, necessitated by the repair work being carried on, lowered the resistance of the men.

Two cases of erysipelas occurred in April; one on the site of a circumcision wound, the other in an axillary abscess which had been opened and drained. Upon investigation it was discovered that a hospital corpsman was the source of infection. Five days previously he had visited his grandmother who had erysipelas in the county hospital at Los Angeles. This man stated that he had not touched the old lady, and that he wore a gown while talking with her. Prompt isolation of the patients and the discontinuance of all surgical procedures limited the disease to these two cases.

German measles appeared in May, but quickly subsided. Eight cases were admitted to the sick list during a period of four weeks. Seven of the cases were isolated in cubicles in the sick bay.

In December a draft of 180 men were received from the U. S. S. *Henderson*; all of whom had been exposed to measles and mumps on that vessel. These men were quarantined on deck, aft of No. 4 turret and taken ashore daily for exercise. One case of mumps and one of measles occurred among the men of the draft. Several cases developed among the crew after the draft had been quarantined for 10 days. Quarantine was then lifted, inasmuch as its further continuance was believed to be useless. At present, six cases of measles are under treatment. The following measures have been and are being carried out for its eradication: Isolation of patients; daily inspection of divisions in which cases have occurred; and rigid sterilization of mess gear. It was unfortunate that a draft of men was sent aboard this ship at this time, as she was already overcrowded.

Venereal disease.—The sources of infection are clearly marked by our cruising record. These infections are most frequent in Puget Sound, less so at San Francisco, and least so at San Pedro. Methods looking toward their prevention consist of the issuing of prophylactic tubes to those who request them, the usual ship's prophylaxis, lectures and moving pictures, and also frequent inspection of the crew for concealed disease. Few concealed cases have been found. Men are encouraged to consult the medical officer on all phases of sexual irregularities. Education and generous treatment are believed to be more valuable than an inflexible system of punishment.

The treatment of gonorrhea consists entirely of irrigation, and since this method has been employed infections of the epididymis have greatly diminished. Smears are made of all venereal ulcers and examined for treponema. If treponema is not found a provocative dose of neosalvarsan is given, followed by a Wassermann. This therapeutic test is invaluable, for in all luetic infections the ulcer heals in from three to five days, and in most cases a plus Wassermann is reported. In very early cases a negative blood is expected. Chancroidal infections are not at all influenced by the treatment.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"LANGLEY" FOR THE YEAR 1922.**

Aviation.—Aviation is of primary importance on this ship, as the ship was designed for flying off and on. Hence, aviation medicine assumes a like importance. Lieut. J. D. Benjamin, M. C., U. S. Navy, reported aboard on December 28, 1922, after having taken a course of training at the school for flight surgeons. No aviation equipment being on board, it became necessary to conduct the annual physical examinations, as prescribed in Form NMS Aviation No. 1, at Hampton Roads and Pensacola at such times that would not interfere with the duties at these stations. This has made it a rather slow and tedious process, as the ship has been either in the stream or maneuvering at sea most of the time.

The ship has six commissioned, one warrant, and one enlisted pilot aboard. A great many planes, as well as spare parts, are carried aboard, as the ship has enormous storage space. Land planes are mostly used and flown from and landed upon a long deck which extends above everything else and the entire length of the ship. This flying on and off occurs both at anchor and under way. During this flying on and off the flight surgeon circles the ship in a flying boat, usually an HS-2, with life preservers and first-aid pouch, to go directly to the spot in case a land plane crashes in the water. At the same time a Navy tug is steaming astern to save the crashed plane

and also assist in saving the aviator. One medical officer is stationed on the flying deck with a hospital corpsman and first-aid pouch, while another medical officer stands by at a lifeboat with another hospital corpsman, first-aid pouch, and stretcher. New devices and suggestions to safeguard flying are continually being tried out and, if effective, put into use. An endeavor is made to have the flight surgeon see all pilots before they go in the air, to determine their immediate fitness for flying. This, however, is not always practical, as often the flight surgeon is in the air himself when a pilot is about to fly. In every way, so far, the pilots have cooperated splendidly with the flight surgeon.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE FIRST BRIGADE, UNITED STATES MARINE CORPS, REPUBLIC OF HAITI, FOR THE YEAR 1922.

Malaria.—During the calendar year 1921 the number of sick days due to malaria was 16,741. The annual sanitary report for 1921 states: "The annual rate for malaria per 1,000 showed practically no change from the year 1920 in spite of very energetic work at mosquito eradication." During the seven years of occupation of Haiti much stress has been laid on protection against mosquitoes, but the actual source of the disease—i. e., the infected Haitian native—has gone unmolested. In August, 1922, a campaign was started by the brigade medical officers along the lines reported by C. C. Bass, of New Orleans, and his coworkers in the Mississippi Valley. Doctor Bass kindly furnished the brigade surgeon with a complete set of reprints and reports which were of great assistance in planning the work. The brigade commander and the American high commissioner gave it their favorable consideration. It was realized, of course, that Haiti, with her 2,000,000 inhabitants, could not be rendered malaria-free by our efforts alone, so the attempts at eradication were necessarily confined to native carriers living in proximity to marine posts. It was assumed in the beginning that 100 per cent of adult natives had been infected at some time, and were potential carriers, even though not actually ill with the fever.

In starting the campaign, one medical officer, Lieut. R. B. Storch, M. C., United States Navy, was sent to all posts. He delivered an explanatory lecture to the men, showing them pictures of mosquitoes and explaining to them how malaria is conveyed. He then interviewed the French priests and the head men of the villages, explaining to them the modern theories of malaria. They were requested to disseminate, as far as possible, this knowledge to the native residents. The priests usually gave a talk on malaria at church gatherings. Then a house to house canvass was made of the natives.

Lieutenant Storch's familiarity with Creole and his enthusiasm made his work invaluable. After these preliminaries, blood smears were made of all natives. About 65 per cent of these smears showed the presence of malarial parasites, often of the malignant type. All positive cases were instructed to take 10 grains of quinine daily for 60 days. This plan itself is most simple, but the difficulties in carrying out the routine are perfectly obvious to anyone who has lived in the Tropics and dealt with ignorant negroes. However, the plan is feasible and despite the pessimism of some medical officers in the beginning, it has proved practical. We are now in the sixth month of its operation and a glance at the table below shows a reduction in number of admissions among the marines, which is considered to be more than accidental:

1921	Admissions.	1922	Admissions.
September.....	160	September.....	76
October.....	140	October.....	43
November.....	145	November.....	36
December.....	141	December.....	41
Total.....	586	Total.....	196

The average strength of the brigade has been reduced by about 200 men, and several camps have been abandoned. These two factors have had a great influence, but hardly enough to account for the sharp decline in the admission rate for the first time in seven years. It is proposed to make a detailed report after a year's work.

Dengue.—Dengue has been present throughout the year. The cases have been of rather mild type, and the eruption has generally appeared.

Dysentery.—During December a sudden epidemic of dysentery appeared in Port au Prince. All commands were prohibited from using any uncooked vegetables or unboiled water. No further cases developed in the marines. There were no deaths. Numbers of deaths in the natives are still occurring. Several members of the officers' families (children and women) were acutely ill, but all recovered except one child of an officer at Cape Haitien. The causative agent was determined to be the Shiga bacillus. Fortunately, polyvalent dysenteric serum had been requested in November and arrived in Port au Prince during the first week of the disease. Its use seemed to be decidedly beneficial in the opinion of the medical officers in Port au Prince:

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE UNITED STATES NAVAL TRAINING STATION, NEWPORT, R. I., FOR THE YEAR 1922.

No true epidemics have occurred at this station during the period covered by this report. Certain diseases have occurred in greater numbers than others, and this would cause it to appear that such diseases were present in epidemic form. The etiological factors of the diseases under discussion, viz, tonsillitis, acute follicular, and bronchitis, acute, appear to rest more upon the ages of the recruits and the climatic conditions under which they are serving than upon epidemic causes. The recruits' ages are usually between 17 and 19 years; they are in the great majority of cases underdeveloped physically and in the course of their training they are exposed to all the varieties of climate common to this latitude.

Influenza.—This disease occurred in endemic form during the month of December in the city of Newport. It is probable that it has been present also at the naval training station. On account of the mild type of the disease, the lack of severity of the constitutional symptoms, the cases have not been diagnostically separated from the acute bronchitis cases.

Diphtheria.—Since July 1, 1922, 15 cases of diphtheria have been diagnosed by cultural methods after transfer from this station to the naval hospital at Newport, R. I. Only 7 of these cases showed clinical symptoms of diphtheria. Guinea-pig inoculations were not practiced, so no estimation can be made as to the exact number of carriers of virulent organisms.

Pneumonia.—This disease has not been prevalent and very few cases have developed

Tonsillitis, acute follicular.—This infection occurred in endemic form during the month of December, 1922. There has not been a central focus of infection, however, as the disease has appeared among the recruits generally and in all of the barracks. Tonsillitis has been the most prevalent disease at the station. Since July 1, 1922, 132 cases were admitted and transferred to the naval hospital at Newport, R. I.

Bronchitis, acute.—Numerous cases were admitted under this diagnosis during November and December, 1922. The cases have been febrile and highly contagious. Clinically the syndrome of influenza was presented. Cultured methods of diagnosis were not employed generally in these cases. The pneumococcus was demonstrated in some of them. The period of illness was five to seven days and slow convalescence with lassitude were common symptoms. The disease has been endemic in Newport and at the training station.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF SUBMARINE
DIVISION NO. 5, HAMPTON ROADS, VA., FOR THE YEAR 1922.**

The general health of the personnel has been fair throughout the year—the annual admission rate per 1,000 being 748.55.

The following table shows the annual rates per 1,000, by months, for 1922, for all causes, influenza, and combined venereal:

Month.	All causes.	Influenza.	Combined venereal.
January.....	1,428	1,020	170
February.....	789	324	187
March.....	842	228	297
April.....	439	.....	146
May.....	363	.....	88
June.....	553	.....	125
July.....	340	.....	38
August.....	577	.....	346
September.....	730	324	162
October.....	331	.....	51
November.....	391	.....	97
December.....	480	48	174

It will be seen that there were four months of the year showing an excessive admission rate per 1,000 for all causes, viz, January, February, March, and, to a lesser degree, September. These correspond to two definite epidemics of influenza, the first occurring on January 26, 1922, when 38 cases were admitted from the crews of the *K-2*, *K-3*, *K-4*, *K-7*, and *K-8*, who were quartered on the U. S. S. *Mars* at the navy yard, Norfolk, Va., while these submarines were undergoing repairs. This epidemic continued during February and March, only sporadic cases occurring toward the last. Influenza, with an annual admission rate of 160.54 per 1,000, leads the list of diseases for the year, closely followed by combined venereal, with an annual admission rate of 145.05 per 1,000.

An examination of the above table shows that the highest venereal disease rates during the year occurred in the months of August and March. The medical officer is unable to assign any reason for the high venereal disease rate in March, but in August the *H* and *L* submarines arrived from the Pacific coast via the Panama Canal and all way points, and in consequence the venereal rate was greatly increased as a result of infections among men occurring in Central American ports. Considering all the conditions, it is rather remarkable that the rate did not rise even higher. The medical officer is aware that the venereal disease rate is too high for a station of this size, and feels that the campaign of intensive instruction which is

being carried on will bring about a reduction in the admission rate for these diseases. However, the nature of the station, composed as it is of many separate units with constantly shifting personnel, make such a program extremely difficult.

The submarine station was practically free from all other communicable diseases, there having been admitted only two cases of pneumonia-broncho, two cases of tuberculosis, chronic pulmonary, and one case of malaria during the year. Attention is also invited to the extremely low incidence of tonsillitis, acute follicular, which is ordinarily one of the common diseases of the Navy. During the year there were 6 admissions with 30 sick days and an annual admission rate of 11.60 per 1,000.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"ABARENDA" FOR THE YEAR 1922.**

The health of the crew, considering the duty that this vessel has been engaged in and in view of the climatic changes encountered, has been excellent. The venereal-disease rate has been high, owing to the fact that this vessel has been in Chinese, Japanese, and Siberian ports a great part of the time. However, the percentage of the crew infected has been at a minimum during the latter part of the year, while stationed in Philippine waters. This is due to the fact that houses of prostitution in the Philippine Islands have been closed. This, however, does not do away with prostitution, as it still exists notwithstanding the efforts put forth by the naval and civil authorities to stamp out this vice. This low percentage of infections is also due to the issuing of the collapsible tubes of unguentum hydrargyri chloridi mitis compositus. The tubes are issued to the men as they leave the ship on liberty. This method, however, does not do away with the old method of prophylaxis, as all men are required to check in on the liberty list either "yes" or "no" as to intercourse; if they check in "yes," they are directed to report to the sick bay, where thorough prophylactic treatment is administered. Since the establishing of this double prophylaxis system the venereal-disease rate has been surprisingly low. During the past three months there was only one admission on that account, the admission being for syphilis.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.
Serial No. 242-1923.

126472(21).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 9, 1923.

To: All naval hospitals.

Subject: Admission of dependents of officers and enlisted men as supernumeraries at naval hospitals.

Reference: Bureau's letter No. 132687-0(102), October 12, 1922.

1. It appears that in some instances the above-mentioned letter has been erroneously interpreted as modifying instructions relative to the admission of supernumeraries.

2. Those legally entitled to treatment and subsistence in naval hospitals are:

(a) The personnel of the "regular" Navy and Marine Corps, active and retired, and certain classes of the fleet reserve.

(b) Pensioners, who relinquish their pensions while in hospital.

(c) Enlisted men whose enlistments expire after admission to hospital.

(d) Civil employees injured in Government establishments, admitted by direction of Compensation Commission.

(e) Veterans' Bureau patients.

3. The bureau would be favorably inclined to provide for the care and treatment of dependents to the extent of its available personnel and equipment at the various hospitals, but in the absence of legal authority and of a specific appropriation available for this purpose, the admission of these dependents is not authorized except when necessary for humanitarian, emergency, or public-health reasons.

E. R. STITT.

Circular letter.
Serial No. 243-1923.

WEE: SS PR&R 124957(23).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 19, 1923.

From: The Chief of the Bureau of Medicine and Surgery.

To: Medical officers at Navy and Marine Corps recruiting stations.

Subject: Physical examinations, inoculations, and vaccinations of applicants to attend citizens' military training camps, 1923.

Reference: Circular letter, serial No. 240-1923, dated February 5, 1923.

1. Attention is invited to paragraph (1) of the bureau's circular letter, No. 240-1923, in that it states that medical officers stationed at training stations shall cooperate in every respect in conducting physical examinations and immunizations to smallpox and typhoid and paratyphoid fevers of applicants for training in a citizens' military training camp during the summer, 1923.

2. In order that there may be no misunderstanding, it is desired that medical officers attached to recruiting stations perform the same duties as outlined in the circular letter which was intended to apply to the medical officers at recruiting stations as well as training stations.

E. R. STITT.

Circular letter.
Serial No. 244-1923.

WSG: ESK 125949(92).
113386.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 21, 1923.

To: All naval hospitals.

Subject: Checkage of officers for subsistence while under treatment in hospital but not subsisted or quartered at hospital.

References: (a) Sections 1614, 4807, 4808, and 4812, Revised Statutes
(b) Department's 11th indorsement, 7869, August 12, 1907.
(c) Bureau's 4th indorsement, 113366/125949(92), November 16, 1922.
(d) Department's letter, 9047-1271-K, December 14, 1922.

1. In 1907 the department (ref. b) held that where an officer "attended the hospital merely for * * * treatment and when on each such day treatment was concluded he proceeded to his home," and "as in the present instance Colonel Denny's admission into the hospital was but nominal, and as he was not maintained at its expense, * * * the deductions in question should not be made."

2. In reference (c) the bureau made request that the department should reconsider its above partly quoted opinion, and that for purposes of its further use in the Paymaster's Manual, United States Marine Corps, said opinion should be revoked.

3. In his letter to the bureau (ref. d) the Secretary has reaffirmed the opinion of August 12, 1907 (ref. b), as follows:

"1. Returned.

"2. Section 4812, Revised Statutes, provides:

"'For every Navy officer, seaman, or marine admitted into a Navy hospital, the institution shall be allowed one ration per day during his continuance therein, to be deducted from the account of the United States with such officer, seamen, or marine.'

"3. This law required that the value of one ration be deducted from the pay of an officer for each day he remains in a naval hospital.

"4. Under the circumstances set forth in the attached letter where an officer is treated at a naval hospital, but is not quartered or subsisted at the hospital, although the hospital records show him to be in receipt of treatment, the officer has not 'been admitted in a naval hospital' within the meaning of section 4812, Revised Statutes, above quoted, and therefore there is no authority to deduct from his account with the United States the value of one ration per day.

"5. The practice of admitting an officer to a naval hospital and issuing a notice of checkage of rations on such admittance, when it is known at the time of admittance that he is not to be subsisted at the hospital, should not be followed. The same practice should obtain in such cases as where the officer reports at a naval dispensary for treatment.

"EDWIN DENBY."

4. In accordance with the foregoing quoted decision, no checkage of rations will be made, except as hereinafter stated, in the case of any officer of the Navy or Marine Corps admitted to a naval hospital when it shall be positively known and unequivocally understood at the time of his admission that he will not be subsisted or quartered at the hospital.

5. The ration notice of admission (Form S) in such a case will be made to read "was admitted to this hospital on January 1, 1923 (?), and will not be

subsisted by the hospital." Should such a case, after admission, require quarters and subsistence, the changed subsistence status will be taken care of when the ration notice of discharge shall be issued, which will be made to read "was admitted to this hospital on January 1, 1923, and subsisted by the hospital from January 20, 1923, to February 28, 1923, inclusive."

6. The decision of the department above quoted does not contemplate that officers in such cases shall have quarters reserved for them which they may occupy at their volition, and during such period of occupancy receive subsistence, as this clearly would not be the same practice as would obtain "at a naval dispensary."

7. The ration notices (Form S and T) will be revised, but pending receipt of the new prints, the naval hospital will issue them, when necessary, as indicated above.

E. R. STITT.

Circular letter.
Serial No. 245-1923.

WSG: ESK 126093(91).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 21 February, 1923.

To: All naval hospitals.

Subject: Administration of oaths.

References: (a) This bureau's letter to "all naval hospitals" 126093(91) of Dec. 28.

(b) Bureau's third indorsement 126093(91) of Jan. 3.

(c) Judge Advocate General's 4th indorsement 19037-150:1 of Jan. 24.

1. Bureau's third indorsement to the Judge Advocate General (ref. b) was as follows:

"1. Information is requested of the Judge Advocate General as to whether this authority to administer oaths for a particularly stated naval purpose will also permit commanding officers to administer oaths in other than naval cases where the printed form relating to such oaths gives instruction that the oath may be administered by 'notary public, clerk of court, or any person authorized to administer oaths'; the affidavit on the Federal income-tax return, for instance, provides that the oath may be administered by any * * * naval officer who is authorized to administer oaths for purposes of * * * naval administration."

"2. It would be convenient in the private and personal business affairs of officer and enlisted-patients, and perhaps vitally important in cases of impending death, that the commanding officer should have this authority."

2. In reply the following indorsement (ref. c) was received under date of January 24:

"1. Forwarded, all papers returned.

"2. In the first paragraph of the third indorsement information is requested as to whether the authority to administer oaths granted by the Secretary of the Navy to the commanding officers of naval hospitals for a specific purpose also authorizes them to administer oaths in other than naval cases where the printed form relating to such oath gives instruction that the oath may be administered by 'notary public, clerk of court, or any person authorized to administer oaths'; the affidavit of a Federal income-tax return, for example, provides that the oath may be administered 'by any naval officer who is authorized to administer oaths for purposes of naval administration.'"

3. In the second paragraph of said indorsement it is further stated that it would be convenient in the private and personal business affairs of the personnel connected with naval hospitals, "and perhaps vitally important in cases of impending death that the commanding officer should have this authority."

4. The act of January 25, 1895 (28 Stat. 639), as amended and reenacted by the act of March 4, 1917 (39 Stat., 1171), provides, relative to the administration of oaths by officers of the naval service, as follows:

"That judges advocate of naval general courts-martial and courts of inquiry, and all commanders in chief of naval squadrons, commandants of navy yards and stations, officers commanding vessels of the Navy, and recruiting officers of the Navy, and the adjutant and inspector, assistants adjutant and inspector, commanding officers, recruiting officers of the Marine Corps, and such other officers of the regular Navy and Marine Corps, of the Naval Reserve Force, of the Marine Corps Reserve, and of the National Naval Volunteers as may be hereafter designated by the Secretary of the Navy be, and they are hereby, authorized to administer oaths for the purpose of the administration of naval justice and for other purposes of naval administration."

5. Consideration of the authority requested and granted by the Secretary of the Navy to commanding officers of naval hospitals discloses that the authority to administer oaths was specifically limited to the reenlistment or the extension of the enlistments of personnel of the Hospital Corps and patients under their respective commands. In the opinion of this office the foregoing does not authorize the administering oaths by the commanding officers of naval hospitals in other than naval cases where the printed forms relating to such oaths gives instruction that the oath may be administered by "any person authorized to administer oaths." It is the further opinion of this office that the foregoing does not authorize such officers to administer oaths for the purpose of making Federal income tax returns.

6. The foregoing opinion is based upon the fact that the authority to administer oaths granted to the commanding officers of naval hospitals is limited to one purpose and that the provision of the act of March 4, 1917 (39 Stat. 1171), above quoted, applies only to those cases where naval officers are authorized to administer oaths "for the purpose of the administration of naval justice and for other purposes of naval administration."

J. L. LATIMER.

Approved 24 January, 1923.

EDWIN DENBY,

Secretary of the Navy.

3. The opinion of the Judge Advocate General, approved by the Secretary of the Navy, becomes a decision of the department and is binding.

E. R. STITT.

Circular letter.

Serial No. 246-1923.

WRJ: ML 125884 (24).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 23, 1923.

To: All naval hospitals.

Subject: Allotments for fiscal year 1924.

1. In order that the bureau may comply with existing instructions relative to the apportionment of appropriations by quarters, it is directed that requests

for allotments state, where equal quarterly allotments are not indicated, the amount that will be required for each quarter. For example, the request covering coal will show a larger amount for the second and third quarters than for the first and second quarters.

2. In this connection it may be stated that all allotments for the fiscal year will be divided into quarterly amounts and that semiannual and annual allotments will not be granted, except for the appropriation, "Bringing home remains, etc."

3. Activities that have submitted requests for allotments for the fiscal year 1924, where equal distribution by quarters is not indicated, will immediately forward corrected requests showing the distribution desired.

E. R. STITT.

Circular letter.

Serial No. 247-1923.

WEE: SS 126472 (24).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 28, 1923.

To: Commanding officers, all naval hospitals and hospital ships.

Subject: Supernumerary patients—Admission and discharge, or other data concerning.

Inclosure: Sample of form to be used.

1. In order that data relative to personnel may be properly filed, it is necessary that the full name, together with the place and date of birth and rating or rank of the individual be furnished the bureau. The admission and discharge of supernumeraries is now being reported to the bureau without complete data. It is, therefore, necessary that hereafter these reports will be made in a form similar to the attached.

2. The supply depot has been instructed to maintain a supply of printed forms for distribution and until the printed form is available report will be made by letter, following the form as attached.

E. R. STITT.

U. S. NAVAL HOSPITAL.

From: Commanding officer, United States naval hospital.

To: Bureau of Medicine and Surgery.

Subject: Supernumerary patient.

Reference: Authority.

1. The following-named supernumerary patient was {admitted to
discharged from} the
naval hospital this date.

----- Name in full. (Surname capitalized.) -----	----- (Diagnosis.) -----
----- Date of birth. -----	----- Place of birth. -----

Circular letter.

WSD/JBC 124677-O.

Serial No. 248-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., March 3, 1923.

To: All naval hospitals in the United States; sick quarters, Marine Barracks, Quantico, Va.; Naval Submarine Base, San Pedro, Calif.

Subject: Annual requisitions for care of the dead, fiscal year 1924.

References: (a) M. & S. circular letter serial No. 231-1922, #124677-O. December 7, 1922.

(b) Manual for the Medical Department, paragraphs 2951, 2953, 2972.

1. Referring to paragraph 8 of the above-mentioned circular letter, it is directed that requisitions for care of the dead shall be prepared substantially in the following form, with such amendments only as may be necessary to meet peculiar local conditions.

Local burial (contingent).

Item 1: For preparation for burial of the remains of the dead (Navy, Marine Corps, Naval Reserve Force on active duty, and supernumerary patients) during the fiscal year 1924, including embalming, all necessary preparation, and placing in casket (necessary clothing, casket, and outside box to be furnished by Government).

Item 2: For transportation of remains to local cemetery, including hearse and one carriage or seven-passenger automobile, health department permit, etc.

Item 3: For all service, etc., included in Item No. 1. except that casket and outside box, will be furnished by undertaker.

Item 4: For opening and closing of grave, including necessary attendants at cemetery.

Item 5: For care of the remains of the dead (Navy, Marine Corps, and Naval Reserve Force on active duty) shipped to the naval hospital incased for burial: service to consist of transfer of remains from transportation company's terminal or other place of arrival, care of remains pending burial, health department permits, etc.

Item 6: For additional service under item No. 5, consisting of reembalming and rearrangement in casket, or transfer to another casket furnished by Government.

Shipment (bringing home remains).

Item 1: For the preparation of the remains of the dead (Navy, Marine Corps, and Naval Reserve Force on active duty) during the fiscal year 1924, including embalming, all necessary preparation, and placing casket (necessary clothing, Navy standard shipping casket and outside box to be furnished by Government).

Item 2: For delivery of remains to shipping point; health department permit, etc.

Item 3: For all services, etc., included in Item No. 1. except that incasement (including inside shell, metallic casket, and shipping box, all complete) will be furnished by undertaker.

Item 4: For additional service under above items, consisting of hearse and one carriage or 7-passenger automobile to shipping point.

Item 5: For care of the remains of the dead (Navy, Marine Corps, and Naval Reserve Force on active duty), shipped to the naval hospital incased for burial: service to consist of transfer of remains from place of arrival to hospital or to

contractor's establishment; care of remains pending reshipment; delivery to shipping point; health department permits, etc.

Item 6: For additional service under item No. 5, consisting of reembalming and rearrangement in casket, or transfer to another casket furnished by Government.

Notes to be placed on both requisitions.

NOTE 1.—Services to be rendered promptly upon receipt of notification, and all services rendered and material supplied to be of a kind and character satisfactory to the commanding officer.

NOTE 2.—It is requested that proposals be submitted to the commanding officer before award shall be made in order that investigation may be made of the quality of material and character of services bidders propose to furnish. Bidders will be required to exhibit the finished casket, hearse, etc., they propose to furnish; otherwise bids will not be considered.

NOTE 3.—It will be necessary to make awards under Requisitions — and — to the same person, as when services are first required in any case it may not be known whether the remains are to be shipped or locally interred.

2. Referring further to the bureau's circular letter No. 231 (ref. a), it is intended that item 3 of the requisitions shall be used only in emergency. A sufficient stock of Navy standard caskets will be kept on hand at all times to supply anticipating needs both for purposes of shipment and local burial.

3. Referring to circular letter, serial No. 221-1922, No. 124677-O, October 12, 1922, requisitions for care of remains of retired enlisted men of the Marine Corps will not be renewed. As such cases will be very infrequent, each case will be handled separately. The body will be turned over to the contract undertaker, and his bills for services, duly certified by the hospital, will be forwarded directly to the quartermaster, headquarters, United States Marine Corps, Washington, D. C., for payment. If the body is shipped by express, notation will be made on the bill of lading that charges are to be billed against the quartermaster, headquarters United States Marine Corps; if on two first-class tickets, the appropriation entered will be "Maintenance, quartermaster's department, Marine Corps."

4. The requisitions for care of the dead, both under "Contingent, M. & S.", and "Bringing home remains, etc.," will show an estimated cost for one payment only.

5. Requests for allotments for transportation and clothing will be submitted but will show no estimated cost.

6. Requisitions and allotments for this character of expenditures are not subject to administrative control, and to allot amounts to each activity only tends unnecessarily to tie up the appropriations. The bureau will set up a reserve for the care of the dead, and when "reports of expenditures" are received the reserve will be debited with the amount actually expended.

F. L. PLEADWELL, *Acting*.

Circular letter.
Serial No. 249-1923.

HWS:MFD 132679(31).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., March 5, 1923.

To: All medical officers.
Subject: Administration of carbon tetrachloride.

In view of the rapidly extending employment of carbon tetrachloride in the treatment of hookworm infestation, it seems well to place before the service the latest information available concerning its administration.

1. The specimen of tetrachloride used should be one known to be chemically pure. It should be stored in tightly stoppered containers, protected from sunlight and, as far as possible, from heat.

2. For the present it is to be emphasized that the dose should not exceed 3 cubic centimeters for an adult of 150 pounds. In larger dosage the drug is apparently not more effective and may prove harmful.

3. It is to be administered in hard gelatine capsules. Soft gelatine capsules are unsuitable in that they often become insoluble in the intestinal tract and escape intact with the feces. Suspensions are dangerous. Tetrachloride, being practically insoluble in water, collects at the bottom of the container and is swallowed pure at the end of the draught, thus possibly giving rise to serious symptoms by its inhalation. Milk, owing to the solubility of the tetrachloride in butter fat, is a better medium, but nevertheless is not a suitable vehicle.

4. Under certain conditions there occurs retention of the drug in the stomach, in which case digestive and nervous symptoms ensue. Some authors report that symptoms arising from this cause can be prevented by the routine use of magnesium sulphate two hours after the administration of the tetrachloride. It may prove of advantage to administer the two drugs simultaneously, but no information on this point will be available until studies now under way have been completed.

5. It has been found that when treating swine a preliminary fast is useful; but it has not been clearly shown in human cases that fasting either enhances the anthelmintic action of the tetrachloride, promotes its progress through the intestinal tract, or lessens the possibility of absorption. In fact deprivation of food may possibly contribute to susceptibility, it having been found that glucose in a measure protects against the symptoms of tetrachloride poisoning. In any case it is well, however, to avoid the ingestion of neutral fats and other substances which act to delay evacuation of the stomach.

6. In alcoholism and certain intestinal infections absorbability appears to be greatly increased, possibly by increasing the solubility of the drug or by making the mucosa more permeable. Existing lesions heighten the susceptibility of the liver and kidney, so that if unusual amounts of the drug are absorbed the outcome depends largely on the condition of these two organs. While tetrachloride has been used without apparent injury in the presence of active fever, as in the course of kala azar and various pyrexias, it is well to avoid its use during any acute illness, and when hepatic or renal disease exists, unless the removal of hookworms is urgently indicated.

7. To summarize the principal conditions causing or leading to the development of untoward symptoms:

- (a) The use of an impure specimen of the drug.
- (b) Conditions in the intestinal tract, or character of its contents, such that prolonged retention of the drug is favored, its solubility increased, or its absorption promoted.
- (c) Specific conditions, such as alcoholism, enteritis, and diseases of liver or kidneys.

8. Knowledge of the pharmacology of tetrachloride is still imperfect, and from reports of fatalities following its ingestion it has not been clearly established whether tetrachloride, some decomposition product, or some adulterant has been responsible, or whether conditions peculiar to the patient or casually present may have determined the outcome. In the cases reported, necrosis and fatty degeneration of the liver have been the most conspicuous features of the pathology, whereas in animals succumbing to lethal doses this has not been observed. In them the symptoms are mainly oedema of the gastrointestinal tract and mesentery, enlargement of the liver with capillary hemorrhages

throughout its substance, hæmaturia, and hæmoglobinuria. In human cases the pathology and the symptom-complex resemble closely those seen in delayed chloroform poisoning.

9. In the light of present knowledge it is probably good practice to administer magnesium sulphate immediately on the appearance of any symptoms, however mild. If there appear symptoms which may be of import, such as tenderness and enlargement of the liver, signs of renal damage, vomiting, cyanosis, œdema, prostration, delirium, stupor, coma, sweetish (acetone) breath, and the signs of a marked disturbance of the acid-base equilibrium, immediate treatment should be instituted as for delayed chloroform poisoning.

F. L. PLEADWELL, *Acting.*

Circular letter.
Serial No. 250-1923.

AWD MET 125470(32).

12 MARCH, 1923.

To: All naval hospitals.

Subject: Subsistence at naval hospitals, comparison of.

Inclosures: Four.

1. The bureau forwards herewith photostats of charts showing the average cost and caloric values of dietaries of the naval hospitals within the continental limits for the fiscal year ending June 30, 1922, and certain other information.

2. It is desired especially to call attention to the high caloric value of the ration of practically all the naval hospitals, which, even allowing for the fact that a high percentage of those subsisted are vigorous young men not suffering from acute disabilities, is in excess of the recognized requirements for men actively physically engaged. This appears to indicate waste or loss of provisions. Allowing for the wastage inevitable in feeding bed patients, it is believed that a ration with a gross value of 3,500 to 4,000 calories is ample, and this estimate is sustained by such statistics as are available from civil institutions. Becker and Hamalainen, of the University of Helsingfors, Finland, as quoted in "How to Live," as a result of actual experience show that active workers, working eight hours daily, require from 2,900 to 3,600 calories only.

3. Chart No. 1 is of comparatively slight value, as the daily ration is to some extent affected by varying contract prices of food, by the character of the service, and by the fact that in some instances the ration is limited by the inability to secure other than articles carried by the supply officer. This chart should be considered in connection with chart No. 3, which shows that for the hospitals at Portsmouth, Chelsea, Newport, New York, League Island, Washington, and Norfolk there is but slight variation in the average cost of provisions. Key West and Pensacola show a considerable rise in the cost of food; Puget Sound, a slight increase; whereas Great Lakes, Mare Island, San Diego, and Parris Island show a considerable drop. These fluctuations in the cost of contract prices are in a measure reflected by the daily cost of the ration except that Annapolis and Washington show an increase of the per diem cost, hardly accounted for by higher contract prices but, to some extent, due to unique location conditions.

4. Chart No. 2: It will be noted that but four hospitals, Chelsea, League Island, Key West, and San Diego, have a ration of 5,000 calories or less. In making any comparison it is desirable to consider the well-established fact that proportionate waste lessens as the number of persons subsisted increases. For this reason the naval hospitals should be divided into two classes—those having a daily average of over 300 persons subsisted and those below that num-

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ber. Under the former come the naval hospitals at New York, Mare Island, San Diego, Washington, Norfolk, Chelsea, Great Lakes, and League Island; under the latter, the naval hospitals at Annapolis, Puget Sound, Newport, Charleston, Key West, Parris Island, Portsmouth, and Pensacola. The average cost of the ration of the smaller hospitals is 83 cents, the average caloric value is 5,937, and the average cost per year of the commissary force for each man subsisted is \$60. In the group of larger hospitals the average per diem cost per patient is 74 cents, the caloric value 5,462 and the average cost of the civilian help drops to \$49. Of the larger hospitals, San Diego makes the best showing with a ration cost of 56 cents per diem, which, however, may be in a measure due to the lower cost of provisions at that port. The caloric value of the ration more nearly approximates what is considered as an adequate ration in a naval hospital—4,000 calories; also, the cost of the civilian help, on the basis given, of \$31, is the lowest of any of the larger hospitals, and only equaled by a similar charge at Newport amongst the smaller hospitals.

5. Charts Nos. 5 to 15 are submitted in order that those interested may make an analysis of the ration of each hospital during the past year and afford a basis for economy in the expenditure of certain articles of diet which are apparently, in some hospitals, consumed in excess of requirements.

6. Assuming that the cost per 100 calories holds or is decreased during the current year, it is evident that a ration of 4,000 calories, issued as a properly balanced ration, should not exceed a cost per diem of 60 cents for this fiscal year.

E. R. STITT.

VITAL STATISTICS.

The "Monthly Health Index," which is published on the 15th of each month, contains the statistical data for individual ships and shore stations. The statistics appearing in this Bulletin are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{52}{3}$ or $\frac{52}{4}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

TABLE NO. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the month of February, 1923.*

	Forces a' oat.	Forces ashore.	Entire Navy.	Marine Corps.
Average complement.....	72,678	43,922	116,600	20,624
All causes:				
Number of admissions.....	2,738	4,255	6,993	1,676
Annual rate per 1,000.....	452.07	1,162.51	719.65	975.16
Disease only:				
Number of admissions.....	2,504	4,029	6,533	1,561
Annual rate per 1,000.....	433.44	1,100.76	672.31	908.25
Communicable disease, exclusive of venereal disease:				
Number of admissions.....	647	1,428	2,075	8,568
Annual rate per 1,000.....	166.83	390.14	213.43	330.49
Venereal disease:				
Number of admissions.....	582	410	992	276
Annual rate per 1,000.....	16.09	112.02	102.09	160.59
Injuries and poisonings:				
Number of admissions.....	234	226	460	115
Annual rate per 1,000.....	38.64	61.75	47.34	68.91

TABLE NO. 2.—Number of admissions reported by Form F cards for certain diseases for the month of February, 1923.

	Forces afloat, Navy and ma- rines (comple- ment), 72,678.		Forces ashore, Navy and ma- rines (comple- ment), 43,922.		Total (comple- ment), 116,600.	
	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.
Diseases.....	2,504	413.44	4,029	1,100.76	6,533	672.31
Injuries and poisons.....	234	38.64	226	61.75	460	47.34
Total admissions.....	2,738	452.07	4,255	1,162.51	6,993	719.65
Class III:						
Appendicitis, acute.....	24	3.96	27	7.38	51	5.25
Autointoxication, intestinal.....	2	.33	17	4.64	19	1.96
Cholangitis, acute.....	18	2.97	10	2.73	28	2.88
Cholecystitis, acute.....	1	.17	2	.55	3	.31
Cholelithiasis.....	1	.17	0	0	1	.10
Colitis, acute.....	0	0	1	.27	1	.10
Constipation.....	11	1.82	14	3.82	25	2.57
Enteritis, acute.....	5	.83	7	1.91	12	1.23
Gastritis, acute catarrhal.....	6	.99	15	4.10	21	2.16
Gastroenteritis.....	15	2.48	35	9.56	50	5.15
Hemorrhoids.....	19	3.14	25	6.83	44	4.53
Pharyngitis, acute.....	13	2.15	16	4.37	29	2.98
Ulcer of duodenum.....	0	0	1	.27	1	.10
Ulcer of stomach.....	1	.17	0	0	1	.10
Total.....	116	19.15	170	46.45	286	29.43
Class VII:						
Varicocele.....	10	1.65	8	2.19	18	1.85
Class VIII:						
Chicken pox.....	5	.83	3	.82	8	.82
German measles.....	0	0	1	.27	1	.10
Influenza.....	346	57.13	848	231.68	1,194	122.87
Measles.....	129	21.30	216	59.01	345	35.50
Mumps.....	72	11.89	44	12.02	116	11.94
Pneumonia, broncho.....	7	1.16	14	3.82	21	2.16
Pneumonia, lobar.....	10	1.65	16	4.37	26	2.68
Scarlet fever.....	26	4.20	12	3.28	38	3.91
Total.....	595	98.24	1,154	315.28	1,749	179.89
Class IX:						
Dysentery, bacillary.....	0	0	43	11.75	43	4.43
Dysentery, entamebic.....	3	.50	4	1.09	7	.72
Typhoid fever.....	1	.17	2	.55	3	.31
Total.....	4	.66	49	13.39	53	5.45
Class X:						
Dengue.....	33	5.45	92	25.14	125	12.86
Filariasis.....	0	0	1	.27	1	.10
Malaria.....	6	.99	113	30.87	119	12.25
Total.....	39	6.44	206	56.28	245	25.21
Class XI:						
Tuberculosis (all forms).....	9	1.49	19	5.19	28	2.88
Class XII:						
Chancroid.....	128	21.13	87	23.77	215	22.13
Gonococcus infection.....	393	64.89	232	63.38	625	64.32
Syphilis.....	61	10.07	91	24.86	152	15.64
Total.....	582	96.09	410	112.02	992	102.09
Class XVIII:						
Bronchitis, acute.....	201	33.19	526	143.71	727	74.82
Laryngitis, acute.....	5	.83	12	3.28	17	1.75
Pleurisy, acute fibrinous.....	4	.66	8	2.19	12	1.23
Rhinitis, acute.....	4	.66	51	13.93	55	5.66
Tonsillitis, acute follicular.....	358	59.11	355	96.99	713	73.37
Total.....	572	94.44	952	260.10	1,524	156.83
Class XX:						
Herniae.....	22	3.63	22	6.01	44	4.53

TABLE No. 3.—*Summary of annual admission rates for venereal disease reported from ships for January and from various shore stations for the four-week period, February 4 to March 3, 1923.*

	Annual rate per 1,000, January.			Average rate since July 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	0	124.45	1,882.35	21.54	109.29	1,215.19
Battleship and cruiser force:						
Atlantic Fleet.....	11.27	180.17	441.72	72.55	158.03	319.86
Pacific Fleet.....	24.14	63.79	153.48	59.72	126.67	415.58
Asiatic Fleet.....	0	0	0	435.23	427.90	580.13
Destroyer force:						
Atlantic Fleet.....	0	213.06	1,882.35	27.71	193.45	481.83
Pacific Fleet.....	0	62.21	367.35	21.54	95.11	607.59
Asiatic Fleet.....	0	112.36	685.71	97.56	445.31	1,044.64
Miscellaneous:						
Atlantic Fleet.....	0	162.18	904.11	33.33	160.67	613.53
Pacific Fleet.....	0	115.50	710.06	15.36	118.76	482.45
Asiatic Fleet.....	0	795.92	1,722.77	85.71	510.95	1,215.19

	Annual rate per 1,000, Feb. 4 to Mar. 3, 1923.			Average rate since Jan. 1, 1923.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States.....	0	67.35	275.42	0	74.21	164.61
First naval district.....	39.21	66.71	95.12	48.58	61.20	65.61
Third naval district.....	0	15.95	32.14	31.09	6.25	107.90
Fourth naval district.....	89.84	63.15	161.61	110.26	136.74	164.61
Fifth naval district.....	0	81.03	199.56	53.09	82.88	150.94
Sixth naval district.....	0	54.04	58.35	0	51.23	54.72
Seventh naval district.....	0	0	0	0	0	0
Eighth naval district.....	0	83.60	101.17	38.71	72.09	80.32
Ninth naval district.....	0	44.50	44.50	39.77	39.77	39.77
Eleventh naval district.....	10.83	85.48	275.42	5.00	77.07	158.42
Twelfth naval district.....	80.65	82.81	85.65	51.60	92.06	112.23
Thirteenth naval district.....	0	11.83	25.05	0	25.10	48.00

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, January.		Per cent since July 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships.....	74.96	6.77	67.79	7.18
Battleship and cruiser force:				
Atlantic Fleet.....	73.91	9.94	69.44	8.42
Pacific Fleet.....	87.84	8.11	74.60	6.65
Asiatic Fleet.....	0	0	49.18	17.49
Destroyer force:				
Atlantic Fleet.....	75.65	5.22	75.18	5.67
Pacific Fleet.....	80.00	12.00	84.00	8.31
Asiatic Fleet.....	80.00	0	50.97	5.26
Miscellaneous force:				
Atlantic Fleet.....	74.76	3.88	67.46	6.03
Pacific Fleet.....	68.11	7.25	72.65	11.38
Asiatic Fleet.....	61.54	0	56.43	4.20

TABLE No. 3.—Summary of annual admission rates for venereal disease reported from ships for January and from various shore stations for the four-week period, February 4 to March 3, 1923—Continued.

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE—Continued.

	Per cent, Feb. 4 to Mar. 3, 1923.		Per cent since Jan. 1, 1923.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States.....	70.66	17.33	75.42	15.92
First naval district.....	80.01	19.00	85.36	7.32
Third naval district.....	33.33	33.33	68.07	20.00
Fourth naval district.....	87.50	0	81.81	3.03
Fifth naval district.....	54.83	27.42	61.76	25.47
Sixth naval district.....	77.77	2.22	75.00	2.5
Seventh naval district.....	0	0	0	0
Eighth naval district.....	100.00	0	99.90	0
Ninth naval district.....	100.00	0	100.00	0
Eleventh naval district.....	81.82	18.18	82.35	1.66
Twelfth naval district.....	81.84	7.14	88.39	6.06
Thirteenth naval district.....	100.00	0	100.00	0

TABLE No. 4.—Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the four-week period February 4 to March 3, 1923, inclusive.

Classes.	Navy (complement), 95,976.		Marine Corps (complement), 20,624.		Total (complement), 116,600.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood.....	1	0.13	0	0	1	0.10
Diseases of circulatory system.....	29	3.63	5	2.91	34	3.20
Diseases of digestive system.....	388	48.51	163	94.84	551	56.70
Diseases of ductless glands and spleen.....	3	.38	1	.58	4	.41
Diseases of ear.....	69	8.63	21	12.22	90	9.26
Diseases of eye and adnexa.....	61	7.63	22	12.80	83	8.54
Diseases of genito-urinary system (non-venereal).....	102	12.75	24	13.96	126	12.97
Communicable diseases transmissible by oral and nasal discharges.....	1,395	174.42	348	202.48	1,743	179.37
Communicable diseases transmissible by intestinal discharges.....	11	1.38	42	24.44	53	5.45
Communicable diseases transmissible by insects and other arthropods.....	77	9.63	174	101.24	251	25.83
Tuberculosis (all forms).....	22	2.75	4	2.33	26	2.68
Venereal diseases.....	726	90.77	276	160.59	1,002	103.12
Other diseases of infective type.....	153	19.13	88	51.20	241	24.80
Diseases of lymphatic system.....	25	3.13	25	14.55	50	5.15
Diseases of mind.....	42	5.25	18	10.47	60	6.17
Diseases of motor system.....	69	8.63	22	12.80	91	9.36
Diseases of nervous system.....	42	5.25	6	3.49	48	4.94
Diseases of respiratory system.....	1,411	176.42	243	141.39	1,654	170.21
Diseases of skin, hair, and nails.....	46	5.75	21	12.22	67	6.89
Hernia.....	30	3.75	9	5.24	39	4.01
Miscellaneous diseases and conditions.....	97	12.13	17	9.89	114	11.73
Parasites (fungi and certain animal parasites).....	128	16.00	31	18.04	159	16.36
Tumors.....	7	.88	1	.58	8	.82
Injuries.....	313	39.13	97	56.44	410	42.19
Poisons.....	30	3.75	18	10.47	48	4.94
Total.....	5,277	659.78	1,676	975.16	6,953	715.53

TABLE NO. 5.—Deaths reported, entire Navy, for the 4-week period, February 4 to March 3, 1923, inclusive.

Cause.	Navy (comple- ment), 95,976.	Marine Corps (comple- ment), 20,624.	Total (comple- ment), 116,600.
Meningitis, cerebrospinal.....	2	0	2
Measles.....	6	0	6
Influenza.....	1	0	1
Pneumonia, lobar.....	8	0	8
Syphilis.....	1	0	1
Other diseases.....	1	1	2
Drowning.....	4	2	6
Other injuries.....	3	3	6
Poisons.....	0	1	1
Total.....	26	7	33
Annual death rate per 1,000, all causes.....	3.25	4.07	3.40
Annual death rate per 1,000, disease only.....	2.38	.58	2.06

VOL. XVIII

NO. 5

UNITED STATES NAVAL MEDICAL BULLETIN

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DEPARTMENT OF THE SERVICE

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COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
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PREFACE.

THE UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT,

Surgeon General United States Navy.

▼

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form, such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc.* All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.

VI

U. S. NAVAL MEDICAL BULLETIN

VOL. XVIII.

MAY, 1923.

No. 5.

SPECIAL ARTICLES.

OBSERVATIONS ON SOME CAUSES OF PHYSICAL REJECTION FOR THE SERVICE.

By D. N. CARPENTER, Captain, and D. FERGUSON, Lieutenant, Medical Corps, United States Navy.

The permanent medical examining board at the Naval Academy is afforded many opportunities in the medical examination of applicants for the service which do not exist at recruiting stations.

About 3,000 examinations are made each year, consisting roughly of from 500 to 700 examinations for entrance to the academy, 100 to 200 preliminary examinations for entrance, about 2,000 annual physical examinations of midshipmen, and about 200 annual physical examinations of the officers attached to the academy, the ships, and post-graduate school.

The senior members of the board are officers of extensive experience, including two or more tours of duty at the academy. The services of an eye, ear, nose, and throat specialist are available and the staff of the local naval hospital are always cooperative in making special examinations and expressing opinions on unusual or questionable cases. Furthermore, the candidate for midshipman presenting a questionable or temporary disqualifying defect will usually reappear for daily examinations until the board accumulates sufficient evidence to act on the case.

Practically all the special instruments of precision and a well-equipped clinical laboratory are available. Opportunity is afforded to observe under service conditions those questionable cases whose defects have been waived by the department, on the recommendation of the Bureau of Medicine and Surgery.

In view of the fact that many members of the Medical Corps without extensive recruiting experience may be called for duty on local medical examining boards for candidates for midshipmen, it is thought advisable to outline the policies dictated by experience at the academy.

Many of the candidates rejected by local boards utilize their option of reporting to the board at the academy and in most instances the findings are in agreement. Discrepancies occur, however, not of mistaken or overlooked physical findings but because long observa-

tion of midshipmen under service conditions has caused us to modify conventional service opinions concerning certain physical defects. Our methods of examination and reasons for our decisions are discussed in detail in respect to the most common causes of rejection, which are as follows: (a) Heart murmurs, (b) flat feet or depressed arches, (c) albuminuria, (d) varicocoele, (e) general physique, (f) height, (g) vision, (h) hearing, (i) color perception.

HEART MURMURS

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The recent war served to coordinate and crystallize the great advances made in cardiology through the introduction of graphic methods during the past two decades and gave many observers the opportunity to study a much larger series of cases than the greatest civilian clinics offer. Among other achievements, "effort syndrome" or "neuro-circulatory asthenia" was adequately studied and described, the old mechanical theory of heart failure exploded, and systolic heart murmurs, per se, relegated to the medical scrap heap.

Functional cardiac murmurs.—The great majority of these murmurs offer no difficulty of interpretation, though occasionally some murmurs present characteristics such that time alone will determine whether or not they are of organic origin.

A safe working rule to apply in doubtful cases is to ascertain whether or not the three essentials for the diagnosis of organic heart disease are present, i. e., evidence of (1) cardiac hypertrophy, (2) impaired cardiac function and reserve, and (3) an etiological factor—a past history of acute polyarthritis or chorea.

Determination of the heart size.—Orthodiagraphy and teloroentgenography are satisfactory methods for determining the *actual* size of the heart in cases of suspected hypertrophy. Smith and Bloedorn in a large and carefully controlled study of clinically normal hearts conclude, however, that due to the "great and unexplained variability of the organ * * * any conclusion as to the *relative* size of the heart based on comparative dimensions, ratios, or relations to body landmarks is fallacious and should be applied clinically with great reserve."

For routine physical examinations the method of Meakins and Gunson may be used. These investigators found that the most accurate physical method, when checked with orthodiagraphy, was to consider the outermost point at which the apex beat lifts the palpating finger as the site of the left cardiac border.

G. F. Freeman used and recommended this method in a study of the normal heart in the Navy.

Determination of impaired cardiac function.—A satisfactory cardiac function test has not been developed, and it is questionable

if it is physically possible for a test to give us the evidence we wish. A well-compensated rheumatic mitral endocarditis of a duration sufficient to give an appreciable degree of myodegeneration may show a better response to effort in a young muscular individual in training than a normal heart may give in one of sedentary habits.

Perhaps the rather elaborate test of Schneider, abstracted and recommended in the NAVAL MEDICAL BULLETIN of November, 1922 (pp. 879-882), is satisfactory, but we have had no experience with it.

The general observation of the effects of a rapid and forceful stationary run and the degree of distress induced is found more satisfactory than the involved blood-pressure, pulse-rate ratios of Barringer, Tigersteht, and others. It also tends to indicate those with the neurocirculatory asthenic syndrome, whose response to forcible exercise is much poorer than that of many organic cardiacs.

In our hands a careful inquiry into the activities of the past three or four years, comparing previous accomplishment with present capacity for the same efforts, is the best index to cardiac function. How far or how long the recruit could run, swim, box, or wrestle two years ago, and how much can he do at the present, and the reasons for any discrepancy, offer a satisfactory basis of comparison.

When it is considered that the individual with rheumatic carditis has a progressive myocardial degeneration which becomes more manifest with time, our reasons for subscribing to the history method rather than to the complexly affected pulse and blood pressure variables is apparent.

The etiology of cardiac disease.—The frequency with which rheumatic fever and chorea are followed by organic heart disease is in direct proportion to the youth of the individual. Practically all cases of rheumatic fever or chorea occurring in the first decade develop organic cardiac disease and the percentage falls through the second decade so that in the third about 50 per cent develop this common complication. The general percentage of rheumatic fever resulting in organic heart disease for all ages is 30 to 40 per cent.

A careful inquiry with the object of developing a past history of acute rheumatic fever should not only be a necessary routine procedure, but a family history showing a rheumatic or cardiac diathesis deserves most careful consideration.

St. Lawrence, in a review of the records of his cardiac and rheumatic patients, was struck by the incidence of these diseases in the parents and other members of the family. His observations may well indicate that there is a familial susceptibility to the rheumatism-chorea-endocarditis triad. It may be well to mention in passing the soundness of his recommendation to perform prophylactic tonsillectomy in the hitherto uninfected members of these families as a

measure to eliminate one of the most common sources of possible subsequent disease.

The other possible causes of endocarditis are difficult to weigh, except lues. Lues can produce endocarditis, its affinity for the aorta and aortic cusps being well known; the age of candidates for midshipmen, however, limits its practical consideration in this connection. Scarlet fever and recurring tonsillitis, especially when accompanied by myalgia or myositis, is not to be disregarded. A history of "growing pains" in childhood is not infrequently obtained from organic cardiacs, as the only apparent etiologic factor. There is, however, no evidence to indicate that diseases like measles, pertussis, and chicken pox can cause endocarditis. It is stated that an appreciable percentage of pneumonia patients who die have acute endocarditis, though among those recovering practically all have unimpaired hearts. Diphtheria may produce myocardial damage, but it is usually nonprogressive and the valves are uninvolved.

The war experience of the English observers caused them to recommend that any recruit, from whom a definite history of acute rheumatic fever could be elicited, should be rejected for the military services on that alone. Ample figures indicate that early disability, long hospitalization, and subsequent pensioning follow in a markedly large percentage.

As "rheumatism" is, unfortunately, a loosely applied term among the laity, it is well to develop in a given history the joints involved, the gross temperature record, the presence of redness and swelling and length of time abed.

Causation of functional murmurs.—Breadbent, in an investigation of cardiac hydrodynamics, concluded that it is remarkable that a systolic murmur is not normally present over the aortic and pulmonary valve areas. Thayer's experimental studies confirm this opinion.

The causation of the functional, accidental, or nonorganic murmur has been the subject of much speculation. There are advocates of the following theories:

- (1) The passage of the blood current over the rigid valve rings into a structure of larger caliber.
- (2) Uneven cusp closure and approximation resulting from (a) temporarily dilated valve rings, (b) relaxation, lack of tone or asynchronism of the chordae tendinae or papillary muscles.
- (3) The position and condition of adjacent lung margins.
- (4) Blood changes affecting viscosity.

Classification of functional murmurs.—W. S. Thayer published an excellent study of the commoner types of functional cardiac murmurs in the Transactions of the Association of American Physicians,

1910. He suggests the following classification for functional murmurs which we find eminently satisfactory:

1. Cardio-respiratory murmurs.
2. Basic systolic murmurs.
3. Systolic murmurs at the apex, present only in the recumbent or left lateral position and disappearing on assuming the erect posture.

For statistical purposes we have examined 1,000 consecutive records of midshipmen and have recorded the frequency with which these different murmurs were encountered. The series is about equally divided among those midshipmen who have had four physical examinations and those having had three. The writers personally and independently examined each midshipman, and frequently a third member of the board confirmed the findings.

1. *Cardio-respiratory murmurs*.—Thayer states that these murmurs commonly appear in late systole, are limited to one phase of the respiratory cycle, as a rule disappear when the breath is held, and they may sometimes be heard with the greatest intensity in the back.

Thomas Lewis states that while the cardio-respiratory murmur generally disappears when the breath is held, it may be heard even then.

We have found these murmurs to rise and fall with respiration and disappear on full expiration. They may, however, be heard when the lungs are semifilled and stationary. Possibly Lewis regards some other systolic murmurs as cardio-respiratory, which they may perhaps be; but for purposes of clarity of classification, it is deemed desirable to regard that systolic murmur which disappears on complete expiration as cardio-respiratory.

This murmur may be heard over the precordium in the region of the apex or the third left interspace. Its transmission is negligible or variable. It is present in 3.1 per cent of midshipmen.

2. *The basic pulmonary systolic murmur*.—Thayer found that this murmur is usually best heard in the third left interspace; it is increased on forced respiration and may disappear on assuming the erect posture or during deep inspiration.

This is the most common functional murmur encountered and the easiest of differentiation.

It was probably responsible for the earlier writers' characterization of the left cardiac base as "the region of auscultatory romance; the area of many sounds but few lesions."

R. T. MacKenzie found it present in 24.4 per cent of normal young men. In our series it was present in 24.8 per cent. In view of Thayer's observation that the murmur may disappear when the patient is standing, it is fair to assume that our percentage would be larger had we also examined each case in recumbency.

The murmur may be heard on either side of the sternum in the second and third interspaces; it is generally short, soft, and blowing, though occasionally it has a harsher quality. As noted by Thayer, the harsher, louder murmurs are not affected particularly by respiration. The more common type of this murmur may be audible only after expiration while one is engaged in seeking to determine if diastole is perfectly clear. The effect of respiration on the murmur is ascribed to the fact that expiration is conducive to easier filling of the right heart while inspiration has the same effect upon the left heart.

In the differential diagnosis of this murmur Lewis mentions that pulmonary stenosis occurs once in a thousand cardiac cases and is always accompanied by a basic thrill. A congenital patency of the ductus arteriosus causes a systolic murmur in this area, but with this lesion the murmur will extend into diastole. The history of a "blue baby" and cyanosis is generally obtained. Lewis, in commenting on this same murmur when heard in the aortic area, states that six cases of aortic dilatation or aneurysm occurred among 5,000 cardiac patients, and that to diagnose aortic stenosis it is necessary to have also present the diastolic bruit of the accompanying aortic regurgitation.

3. *The systolic murmur at the apex.*—Thayer recognizes two functional murmurs occurring at the apex. The first and most common one is a bruit heard only in the recumbent or left lateral position and disappearing when the erect position is assumed.

The second murmur is a constant systolic murmur, present in all positions and unaffected by the respiratory cycle. It may be differentiated by: (1) Its occurrence late in systole; (2) the first sound at the apex is normal in quality; (3) the second sound in the pulmonary area is not accentuated; and (4), as with all functional murmurs, there is no cardiac enlargement.

We have no figures to offer on the occurrence of the systolic murmur at the apex which is only present in the recumbent position, as we routinely examine the heart while the patient is standing. Only in doubtful cases, when attempting to bring out the presystolic rumble of mitral stenosis, do we have the patient in recumbence.

We can not too strongly urge the general adoption of Thayer's four demands before pronouncing a constantly present systolic murmur at the apex to be of functional origin.

When heart murmurs fell from their high pedestal as the first diagnostic point of endocarditis, the pendulum, as ever, swung too far in the opposite direction. Too frequently we heard from the medico-military man, "Suppose there is a degree of mitral regurgitation, compensation and response to effort are excellent; there is no stenosis or extensive myodegeneration; he can well carry on, so

pass him." In support of this practice, Balfour maintains that organic mitral disease, sufficient to produce regurgitation, is always accompanied by a degree of narrowing of the mitral orifice; therefore the only definite proof of mitral disease is the presence of a presystolic murmur. This was all very well as a war-time measure, but it must be noted that evidence is accumulating indicating that approximately 60 per cent of those mitral systolic murmurs which could, by ignoring Thayer's requirements, be regarded as of functional origin or trivial import, now prove to be organic. How much that 60 per cent will increase during the next five years is problematical, but that there will be a further increase is not to be doubted.

The functional basic diastolic murmur.—The Graham-Steell functional murmur, due to a relative pulmonary insufficiency from increased intrapulmonary pressure, is met very rarely. A "murmurish" pulmonic second sound, audible only on holding the breath on complete expiration, is not uncommon. The "murmurish" quality usually disappears on exertion, the resulting increased cardiac tone causing the pulmonic second sound to assume characteristics indicating a clear, brisk, and competent closure of the valves.

The diastolic murmur of aortic incompetency may be best heard into the third left interspace, so careful study is necessary before the Graham-Steell murmur can be diagnosed. As the latter originates in the pulmonary valves the peripheral signs of aortic regurgitation, together with the characteristic left ventricular hypertrophy, will be absent.

The cardiac arrhythmias.—The most frequent arrhythmias encountered are premature contractions and normal or sinus arrhythmia. The former, per se, can be regarded as of no pathological import. Commonly, it can be caused to disappear by exertion. The latter arrhythmia is the slight normal variation in rate, due to respiratory effects.

Twice in the past year we have encountered slow fibrillators, whose activities were nothing short of marvelous, considering that they probably had had auricular fibrillation for years. Both had absolute irregularity in force and rhythm, and no phases of a dominant rhythm could be detected. Both were characteristic cases of rheumatic endocarditis, though cardiac functional tests evoked normal responses.

FLAT FEET.

Depressed arches or flexible flat feet should not be a cause for rejection unless there is a history of arch symptoms, or that arch lifts have been worn over a long period.

By observation it appears that a symptomless flat foot, with strong, well-developed muscles, stands the strain of service requirements much better than a high-arched weak foot.

The present procedure of making a notation of all depressed arches, advising the candidate of the foot exercises to be performed and the promptness with which they will be surveyed from the service on complaint of disability, causes one to speculate on the incidence of psychical symptoms in pes planus.

In a consecutive series of 1,000 men accepted, 344 (34.4 per cent) had depressed arches or flat feet. Of this number just one man was surveyed for pes planus, and it was questionable whether it would not have been more in the interests of accuracy to survey him for an unmistakable psychopathy.

An occasional case of acute foot strain occurs in individuals with high-arched, weak feet. This is invariably relieved by the Ochsner stirrup and foot exercises.

The incidence of anterior metatarsalgia after entrance to the academy is negligible. This is ascribed to shoe fitting with the standard Navy foot measure. These measurements show that the average candidate wears a shoe from 1 to 2½ sizes too small. Apparently, with a shoe of sufficient length, the transverse arch does not break down.

ALBUMINURIA.

In 519 consecutive entrance examinations of candidates in 1922, albuminuria occurred in 82, a percentage of 15.8. It is obvious that there can not be such a high incidence of nephritis in young men. Further study of these candidates resulted in the rejection of but seven, two of whom were subsequently waived by the bureau. It is perhaps not without interest to speculate on the causation of the condition.

There are apparently three causes of albuminuria in candidates for midshipmen, the two most frequent ones not being cause for rejection.

In order of frequency they are:

- (a) "Travel" albuminuria.
- (b) Orthostatic albuminuria.
- (c) Albuminuria of nephritis.

"*Travel*" albuminuria.—By this we have designated an appreciable albuminuria, usually accompanied by finely granular casts, cylindroids and blood elements, which promptly and permanently disappears.

It is most frequently seen in those candidates who have traveled quite a distance, spending 24 to 48 hours en transit. During this time they have partaken of a most irregular and faulty diet. Exercise has been limited, the usual fluid intake reduced, a degree of constipation occurs, and there is usually a history of body chilling. How

large a factor is anxiety, or other psychic trauma from strange and unusual environments, is unknown.

On being advised to eat properly, rest, and correct faulty elimination, the urine promptly becomes normal and remains so. In a large percentage of these cases, a previous history of scarletina is obtained, and many are of undeveloped physique and not especially robust.

Orthostatic albuminuria.—This is not an infrequent cause of albuminuria and contrary to a common teaching, is usually accompanied by red blood cells.

These individuals are usually of the same physique as the foregoing class, and may show concurrently, a degree of scoliosis or lordosis.

The candidates with postural albuminuria are directed to empty the bladder before retiring, save the night urine, to take a half hour's walk after breakfast and be prepared to pass another specimen on arrival at sick quarters. The night specimen will be albumin free; the morning specimen will show the characteristic findings.

These cases are carefully considered by the board, and those giving excellent promise of development are accepted. The carefully regulated and medically superintended physical drill after entrance for the "weak squad" seem much superior to braces in curing this condition, as well as postural scoliosis. The exaggerated "plebe brace" and gymnasium rules for posture no doubt assist.

Albuminuria in nephritis.—Any albuminuria, not postural in origin which may or may not be accompanied by casts and blood elements persisting for three consecutive days, is regarded arbitrarily as indicating nephritis, whether or not other evidences of nephritis are present.

This may be regarded as dogmatic and unwarranted, but as few candidates are financially able to live longer at their own expense in the city, and as it is not incumbent upon the Navy to go further into their condition, they are rejected as with albuminuria and advised to consult their family physician on their return home.

All cases of albuminuria are given a special examination in which a comprehensive past history is obtained and special emphasis is laid on a history of nocturia and edema. Blood-pressure readings are made, but blood chemistry and phthalein estimations are not performed. In our experience nocturia is the most valuable symptom. It indicates that kidney function is impaired to the extent of not permitting the normal postprandial renal concentration of the products of nitrogenous katabolism. The kidney is required to continue to function during the night, in order to rid the blood of the excess nonprotein nitrogen, urea, and uric acid. This inability to concentrate is manifested by the excessive urinary secretion necessary

to eliminate those amounts of the products of nitrogen metabolism which the normal kidney, by concentration, could remove in normal quantities of urine.

Blood-pressure readings, particularly a single one, are found rather misleading. The very labile nervous system is conducive to an anxiety vasoconstriction and cardiac acceleration. After reassuring the candidate and putting him at rest, subsequent examinations will show a reading 20 to 30 millimeters lower.

The renal changes in most of these cases apparently have not advanced sufficiently to require the compensatory elevation of the blood pressure. It would seem that the blood pressure is elevated only after nocturnal renal function (manifested by nocturia) has been inadequate to maintain renal elimination for a prolonged period.

VARICOCELE.

The frequency of degrees of varicocele of the left spermatic cord is almost that of the frequency of the cords themselves.

Every year, two or three postoperative cases are reluctantly accepted with pronounced degenerative and inflammatory changes in the testicle, simply because they were rejected previously elsewhere for varicocele, and operation advised.

A symptomless varicocele of almost any size is accepted at the Naval Academy. Though an occasional one does come to operation after entry into the service, we know that the operation will be performed by a surgeon who will leave sufficient veins to adequately care for the circulation of the testicle, and there will not be the disastrous end-results which we so commonly see.

As some civilian surgeons perform the operation it would probably be better were they to do what their operation does in effect—a left orchidectomy. Much postoperative disability would then be saved.

One or two cases each year present a hydrocele of the tunica as a sequel to their varicocele operation. These invariably come to operation.

These observations on varicocele were communicated to the Bureau of Medicine and Surgery with the recommendation that varicocele be not regarded as a cause for rejection unless producing symptoms. The bureau approved the recommendation, and the new edition of the Manual for the Medical Department contains this change. The pamphlet containing the physical requirements for candidates for midshipmen approved by the Bureau of Navigation and issued by the academy has had this change for the past two years.

In this connection it may be well to point out that relaxed external inguinal rings should not be regarded as cause for rejection when the internal rings are adequate. A patulous external ring admit-

ting two or more fingers may indeed be not undesirable in event of hernia later developing, as one point for possible strangulation is eliminated.

POOR PHYSIQUE, NOT ROBUST.

This may be as good a cause for rejection as organic disease; the law definitely states (Manual for the Medical Department, 1917, par. 1981): "Candidates are required to be * * * well formed, and of robust constitution."

X-ray examinations of the chest are made as a routine procedure to supplement and check physical findings in these cases and the results included in the report of rejection.

Without years of experience in observing young men develop it is indeed difficult to decide who will and who will not make good service risks. In the absence of demonstrable tuberculosis or a tuberculous association, a history of prematurity or severe infantile rachitis, or actual organic disease, it is remarkable how those of poor physique may develop. A growth of $1\frac{1}{2}$ inches and a gain of 30 pounds in six months is not an uncommon occurrence.

At the age of 16 or 17 years these candidates develop very much better and more rapidly than those at 19 and 20 years, all things being equal. At the latter age the growth and development is practically nil in those of poor physique.

There is a suprisingly small percentage of uncinariasis among candidates for midshipmen from the Southern States, in proportion to the incidence among enlisted recruits. Roughly the incidence is only about 0.5 of 1 per cent as compared with 15 to 30 per cent for the enlisted personnel. Therefore hookworm infestation can almost be disregarded as a cause of poor physique in candidates for the academy.

HEIGHT.

The new regulations governing height for candidates for midshipmen promise to be satisfactory if rigidly enforced.

It is to be borne constantly in mind that the height of 62 inches at 16 years of age and an additional inch for each year or fraction over 6 months is the absolute minimum.

Prior to the new regulation our statistics here showed that 10.6 per cent of each graduating class was below the required officer's height of 66 inches. By enforcing the new regulation it is possible to cut this percentage about half.

VISION

Of all causes of rejection at entrance, defective vision stands first. The requirements of 20/20 Snellin is the best practical test we have to determine if vision is "normal," but this does not neces-

sarily mean that the eye is emmetropic. On the contrary there may be a considerable error of refraction which good accommodations can overcome. Myopic astigmatism, simple or compound, is the most common defect, and when accommodation weakens or the condition progresses after entrance these cases have difficulty in passing the required standard. The hyperopes can usually pass; their trouble is asthenopia from intensive study. It is extremely important that candidates be required to have 20/20 *in each eye* and that they be carefully watched to prevent squinting, which may add from 3 to 5 feet to their vision. Also candidates should be specifically observed to determine that no myotic has been used or that the test types were learned.

HEARING.

The Instructions for Medical Officers of 1917 emphasizes the voice-conduction test for the final decision, although the watch, acumeter, and bone-conduction tests are to be also used. Experience at the academy is in accord with the bureau's instructions. Candidates with perfect voice conduction have been accepted whose watch conduction was below the standard, yet on repeated annual examinations they have no evidence of deafness. Candidates with impaired voice conduction should not be accepted, however, as they invariably show progressive deafness on reexamination.

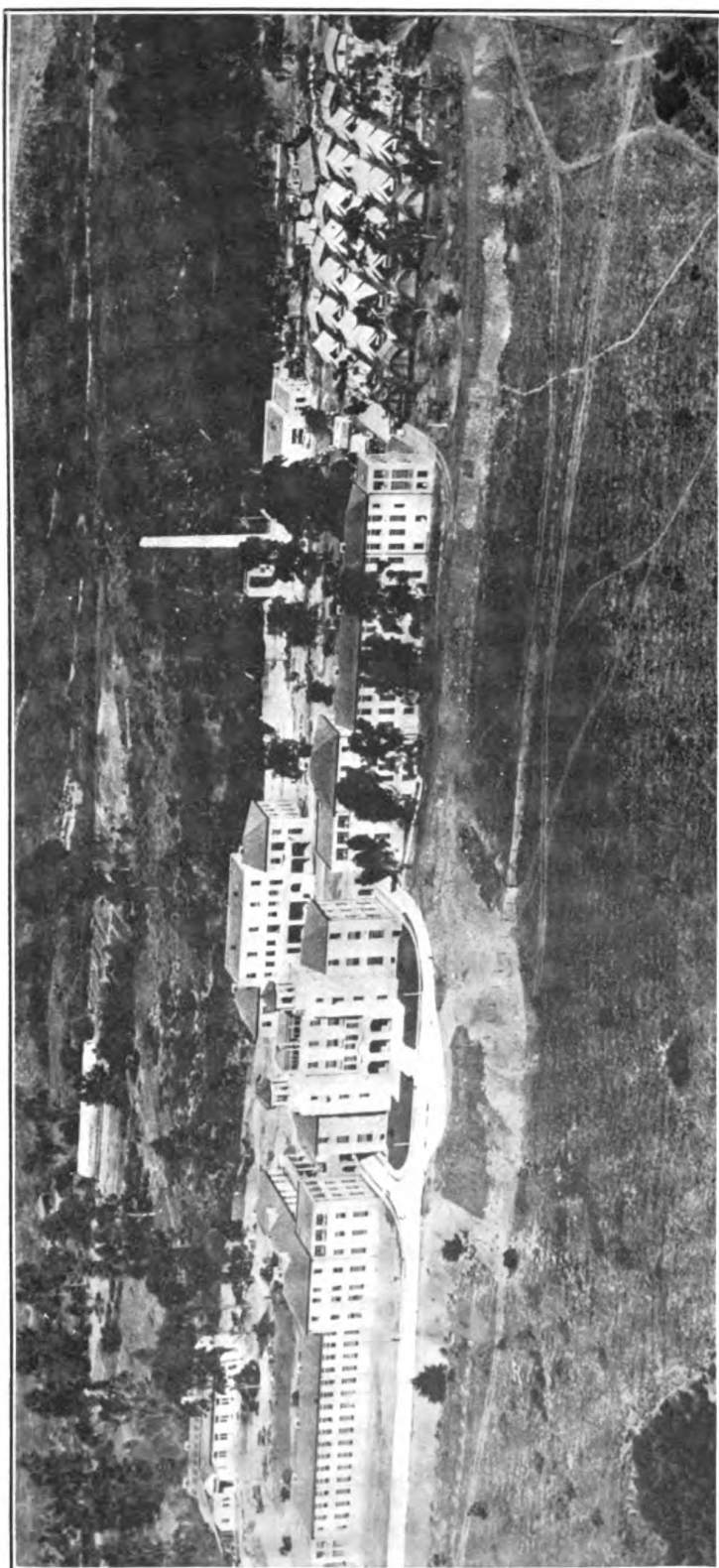
COLOR PERCEPTION.

The woolen skeins and Jennings self-recording tests are used at the academy but the deciding test is the Edridge-Green lamp. This latter test does not involve the question of "knowing colors" or "shades" but determines whether or not the future lookout and officer of the deck can quickly distinguish red, green, or white lights under service conditions of smoke and fog.

The new Ishihara test has been found to be very sensitive in detecting any weakness of color perception and is recommended to be used as a routine. All cases which show red-green blindness by this test should be very carefully examined with the lamp. They may fail or else show hesitation on differentiation of the fogged or smoked lights. The value of the Ishihara as a *final test* is impaired, however, by the fact that a number of cases which show red-green blindness can pass the lamp test perfectly. As the service requirement is to see green, red, and white lights, a candidate should not be rejected who can pass the lamp test.

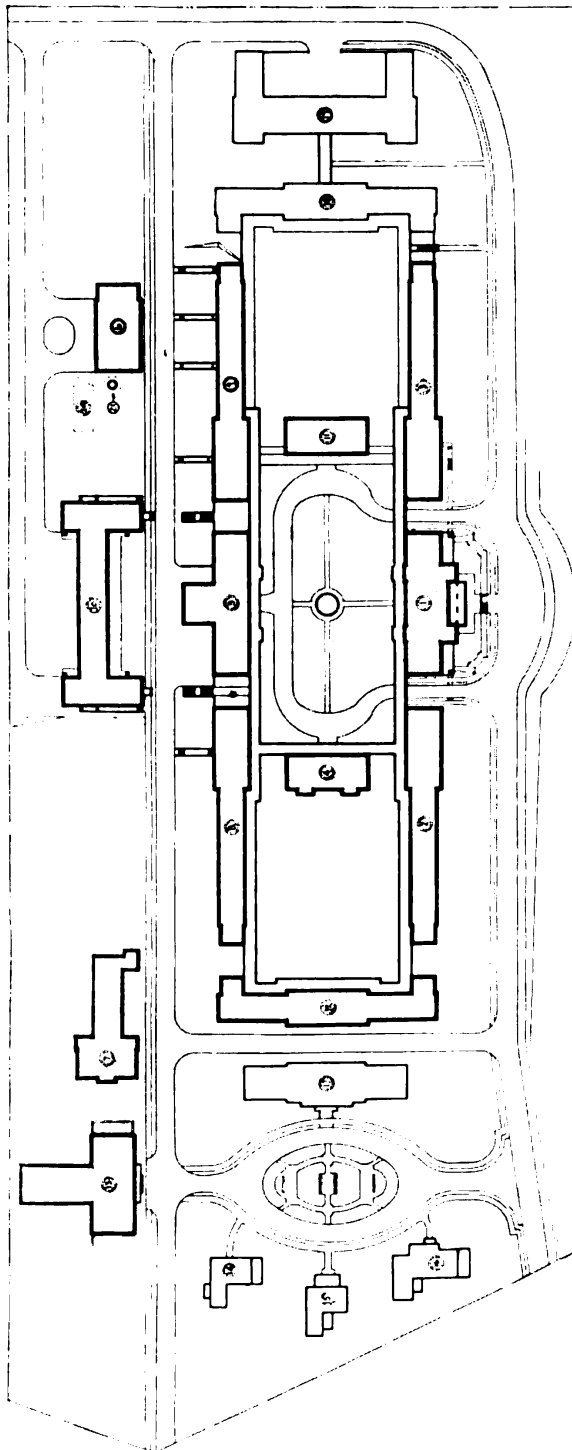
At the annual examination this year about 3 per cent of midshipmen who passed the lamp and skein test were found to show impaired color perception by the Ishihara test.

The intensity of illumination is an essential factor in those whose color perception is weakened.



NAVAL HOSPITAL, SAN DIEGO, CALIF.

556-1



556-2

NAVAL HOSPITAL, SAN DIEGO, CALIF

PLOT PLAN

SCALE - 1"=40'-0"



LEGEND

- 1 ADMINISTRATION BUILDING
- 2 WARD BUILDING 'A'
- 3 WARD BUILDING 'B'
- 4 OPERATING BUILDING
- 5 SUBSISTENCE BUILDING
- 6 POWER HOUSE
- 7 OLD CROSS CONVALESCENT HOUSE
- 8 WARD BUILDING 'C'
- 9 WARD BUILDING 'D'
- 10 SERVICE BUILDING

- 11 RECEIVING BUILDING
- 12 WARD BUILDING 'E'
- 13 NURSES QUARTERS
- 14 OFFICERS QUARTERS
- 15 OFFICERS QUARTERS
- 16 COMMANDING OFFICERS QTRS
- 17 SICK OFFICERS QUARTERS
- 18 WARD BUILDING 'F'
- 19 WARD BUILDING 'G' (CONTAGIOUS)
- 20 FULL OIL TANKS
- 21 POWER HOUSE STACK

THE NAVAL HOSPITAL AT SAN DIEGO, CALIF.

By A. W. DUNBAR, Captain, Medical Corps, United States Navy.

During the World War, owing to the mobilization of naval forces at San Diego, it became necessary to establish a temporary hospital, which was at first small in size, located in one of the exposition buildings in Balboa Park. As the needs increased, it grew by taking over other buildings. This arrangement, however, was not satisfactory for permanent use. A reservation of 10.7 acres was tendered the Government by the citizens of San Diego. The site is located on ground about 224 feet above sea level and surrounded by the park system of San Diego, known as Balboa Park, which will prevent encroachment of the residential section of the city upon the hospital.

The plan selected for this hospital is that of a rectangular block. The orientation is westerly, this being necessitated by the nature of the terrain; the hospital, facing the Pacific Ocean and the harbor of San Diego, is favorably situated in regard to the prevailing breeze.

In order to conform to the local style of architecture, the mission type has been adopted. The construction is fireproof, consisting of hollow tile with light buff stucco exterior. The interior is finished with plaster laid on metal lath, with hollow-tile partitions. The roofs are pan-and-cover red tile, or, where required, glass tile; and on flat roofs a pitch composition is used.

In the wards and corridors of the hospital building red magnesite has been adopted, this being laid on a concrete base with a cove of the same. The diet kitchens, toilets, bathrooms, utility rooms, and dressing rooms have a white vitreous 2½-inch square tile floor and wainscot. The lobby of the administration building has the floor and wainscot of gray Tennessee marble. The dining rooms in the subsistence building have a magnesite floor. The main operating rooms have a floor of white marble tiles 6 by 6 and also a 7-foot wainscot of the same material. The walls generally, where no wainscot is provided, are of plaster and painted a light buff color.

No artificial ventilation system is provided, but all ward spaces are furnished with double-hung windows provided with separate shades for each section. The various buildings of the hospital are provided with automatic telephone connections. A silent call system is installed in all spaces occupied by patients.

Electric elevators (not automatic) are provided in all separate buildings. Automatic electric dumb-waiters are furnished for serving the food to the diet kitchens on the various floors.

The power house, located in the southeast corner of the reservation, supplies steam for all purposes. A recently devised burner of high efficiency, through the use of compressed air, makes this ar-

rangement very economical. Electric current is obtained from the city mains.

Heat is supplied by direct radiation, steam being carried through high-pressure lines to each building and there reduced. Hot water is furnished from generators in the basement of each building.

In the completed hospital the erection of the following buildings is contemplated:

An administration building is located at the center of the west side of the rectangle with a two and one-half story ward building on either side. On the east side of the rectangle at the center is a three-story subsistence building and on either side of that a three-story ward building. The inclosed court, having dimensions of 380 by 85 feet, is divided into three equal portions by walks, and will contain an operating building and a specialty building, the former located between the proximal ends of the northerly wards and the latter in corresponding position between the southerly wards.

In the rear of the subsistence buildings there is to be erected a building for the installation of the various artificers' workshops and on the second floor barracks for the hospital corpsmen. To the northward of this building is a recreation building erected by the Red Cross.

North of the main hospital will be erected a ward for officer patients and quarters for the medical staff and for the nurses. To the south of the hospital there is to be a contagious building, and in the southeast corner building for the civil personnel.

All the buildings assigned for the care and treatment of the patients are to be connected on their court side by a covered and partially inclosed passageway, that portion connecting the operating building with the wards being entirely inclosed.

The administration building is three stories in height in the wings and five in the center, the latter being surmounted by two ornamental mission towers. The first floor of this building has a waiting room, offices for the commanding and the executive officers and the officer of the day, offices for administrative purposes generally, and a dispensary. On the second floor are located consultation rooms, a medical library, chief nurses' offices, and offices for the junior medical officers. On this floor, and also on the third and fourth floors with the necessary toilets, utility rooms, and diet kitchens, are 30 rooms for sick officers. The roof over the central portion is partially inclosed for use as a solarium.

The ward buildings are so similar that one description will, with minor exceptions, serve for all. Each is calculated for 30 beds on 8-foot centers, giving approximately 1,200 cubic feet of air space per patient. The proximal portion of each ward space contains

four quiet rooms, a linen room, dressing rooms, utility, bath, toilet, diet kitchen, and nurse's room. At the distal end is located a large solarium separated from the ward by a utility room and toilets. Each ward wing on the west side has two complete stories and for about half its length a fourth floor which is designed for treatment in the open air, having a large open area 20 by 20 feet, the rest of the space being occupied by a recreation room, diet kitchen, and the usual utility rooms.

The ward buildings on the west side of the rectangle differ from the preceding only in that they have an additional ward in each.

The north and south buildings, completing the inclosure, will be two stories at the western end and three stories at the eastern end, being adapted to the height of the adjoining wards on the west and east sides, respectively.

The subsistence building has a basement in which is located a carbonic acid refrigerating machine, which also manufactures ice for the hospital. Separate chill rooms are provided for fresh meats, smoked meats, poultry, butter and eggs, milk, vegetables, and ice cream, the temperature of each of these spaces having automatic thermostatic control. The remaining space of this basement affords storage for dry provisions and the meat and vegetable preparation rooms and a mess room for the civil employees. The supplies are transported to the main kitchen by means of dumb-waiters. On the first or ground floor, centrally located, is the main kitchen, with a complete equipment of ranges, stock kettles, steam roasters, and steamers. The fuel used in the ranges is crude oil, which is economical and convenient. Adjacent to the main kitchen is the main diet kitchen. The wings of this building are occupied by two mess rooms, each accommodating 96 patients, and scullery equipment. Two sterilizing and dishwashing machines assure thorough cleansing of tableware. On the second floor is located the mess rooms for the Hospital Corps (72 men) and 119 patients, also a dining room for the staff mess.

The operating building consists of two stories. On the ground floor is the dental operating rooms, dressing room, operating room for nose and throat department, a small laboratory and X-ray room. This floor is magnesite. The main operating rooms, two in number, are situated on the second floor, with a northern exposure, and have between them the sterilizing and instrument rooms. Separated from the above by an east and west corridor are the anesthetizing rooms, recovery room, the nurses' dressing room and a workroom. Artificial lighting of the operating rooms is provided by five 100-watt ceiling lights. Access to this floor is by means of elevator, and also by a stairway. The main operating rooms have white marble floors and wainscoting of the same.

Detailed plans for the building for sick officers and for the isolation unit have not yet been drawn. At the present time, the following buildings have been completed: The administration building, two adjacent ward buildings, operating building, subsistence building, power house, and recreation building, and under construction are the service building and the nurses' quarters and the two wards adjacent to the subsistence building. The specialty building, when completed, will contain the general laboratory activities, chemical, bacteriological, and seriological; also the X-ray department and the eye, ear, nose, and throat service. A complete physiotherapy service will also be installed.

ADVANCES MADE IN OUR PROFESSIONAL WORK DURING THE PAST YEAR.¹

By W. D. OWENS, Lieutenant Commander, Medical Corps, United States Navy.

During the year just completed, under the leadership of Captains F. W. F. Wieber and Holton C. Curl, Medical Corps, United States Navy, broad professional policies have been instituted, and to-day the naval hospital at San Diego enjoys an excellent reputation both from the standpoint of material and from the standpoint of professional accomplishment. Every member of the staff must feel a just pride in the fact that he is connected with an institution which exemplifies the finest and most modern in hospital construction. The commanding location in Balboa Park, the attractive architecture, so happily conceived that the hospital blends in splendid harmony with its environment, are undoubtedly incentives toward professional proficiency. But location and architecture are not the paramount reason for our professional effort. The reason lies deeper; it lies in the inspiring influences exerted upon American medicine by such institutions as the Mayo Clinic, the Massachusetts General Hospital, the Johns Hopkins Hospital, the American Medical Association, and the American College of Surgeons. It is our desire to keep the Navy Medical Corps in step with the work being done by these institutions and to keep up with the advances made in modern medicine, which has encouraged us to make the necessary effort.

The medical officer entering the Naval Medical Corps 15 or 20 years ago might readily have thought that the most important function of a naval hospital was to prepare for the commanding officer's inspection. Fortunately in recent years more and more emphasis is placed upon the professional work, and one could not but be impressed during this past year with the fact that both our commanding officers accepted every opportunity to advance the professional efficiency of the hospital.

¹ Paper read at the biweekly conference of medical officers held at the United States Naval Hospital, San Diego, Calif., Jan. 11, 1923.

The professional policies which have been instituted by Captain Wieber and Captain Curl during 1922 may be summarized as follows:

1. The development of systematized group medicine as a means of utilizing the most up-to-date methods of diagnosis and treatment.
2. The development of teamwork and the adoption of certain professional doctrines.
3. The systematic development of the educational possibilities of the institution, with the idea of sharing our advantages with the naval medical officers detailed for duty in this vicinity.
4. The acceptance in principle of the efforts being made toward a higher hospital standardization by such organizations as the American Hospital Association, the Catholic Hospital Association, the Methodist Hospital Association, the American Medical Association, and the American College of Surgeons, and having in mind the basic fundamentals suggested by these institutions to maintain our organization in harmony with their efforts. Thus the present complete and comprehensive case papers, the posting of the preoperative and postoperative diagnoses, and the submitting of all operative specimens to the laboratory for examination and report are a part of our endeavor to comply with civilian hospital standardization.

In order to meet the first of the policies enumerated—that is, the adoption of the most up-to-date methods in diagnosis and treatment—we naturally turn to those institutions which to-day are placing American medicine on the highest pinnacle of scientific accomplishment.

In the Naval Medical Corps we are not Mayos, or Criles, or Cabots, but we may glean much from their methods; and if we wish to achieve our rightful place in the medical world, we should organize our naval hospital in a manner best suited to meet the increasing responsibilities and perplexities of group medicine.

Group medicine was instituted in naval hospitals as early as 1905, but it is only recently that it has become sufficiently coordinated and well balanced to successfully meet the requirements of modern medicine. With the advance of group medicine specialization has received an even greater impetus in our hospital work, and to-day the requirements placed upon specialization have become so exacting and far-reaching that the naval specialist must concentrate in time and energy upon his particular endeavor. The naval specialist has thus become more learned and more skillful in his chosen field of work, but the advance along special lines frequently has been accomplished at the sacrifice of a thorough knowledge of the broader field of medicine. Commander Harold W. Smith has termed this condition "narrow specialism." Unless this tendency toward narrow specialism is corrected the specialist becomes isolated and prone to

give undue emphasis to the individual as a part and not as a whole. Isolation of the specialist is not a condition peculiar to the Naval Medical Corps. It is a situation which has developed in the profession at large and toward the correction of which more and more attention is being directed.

We would do well to keep in mind the fact that science is knowledge and art its execution. The ability to remove an appendix does not make a finished surgeon, or the ability to perform a tonsillectomy determine an ear, nose, and throat specialist; and likewise one is not termed a "dentist" because one pulls teeth.

To accomplish scientific work in some special domain and to be an asset in group work requires more than art; it requires a scientific knowledge of one's specialty and a sufficiently broad knowledge of the other branches of medicine to enable the specialist to do his full part in harmony with the other departments, working as a team toward a common purpose, the complete investigation of the patient. In an address made before the American College of Surgeons, October 27, 1922, Harvey Cushing emphasized this point when he stated: "It seems to me that it would not be a bad idea if in our test of eligibility for fellowship in the college—tests, which not only are those of moral and professional character but of operative experience and skill—we should demand something more than the mere report upon a fixed number of major operations successfully performed, but should require, as well, information as to whether the diagnosis of these cases were the result of the candidate's own personal observation, or whether they were made for him by another." These remarks were made in connection with his contention that primarily the surgeon must be a good physician. This idea of Cushing's is not a new one; it is an old idea made manifest by the increasing perplexities and responsibilities of modern medicine. Two centuries ago Lanfranc emphasized this same thought when he remarked that "No one can be a good physician who has no idea of surgical operations, and a surgeon is nothing if ignorant of medicine."

That the Bureau of Medicine and Surgery is fully cognizant of the fact that isolation of the specialist is a modern complication incident to an intensive application along particular lines of work is fully set forth in an editorial which appeared in the November "United States Naval Medical Bulletin" and from which the following paragraph is quoted:

"The evils too often attendant on specialization are universally recognized. To have intensive knowledge of one thing may be well, but it can not compensate for extensive ignorance of most other things. When there prevails narrow specialism such as I have sug-

gested, the power to act together for the attainment of a common end is lost. When each man is an authority only in his little corner, and is ignorant of all but a small part of the marvelously complex being he serves, intelligent service degenerates into purposeless tinkering and progress ceases by dispersion of its forces. Thus the structure of higher knowledge is broken into fragments. And as long as a heap of stones does not suffice to make a temple, so long will an assemblage of specialists fail to constitute a diagnostic unit. The facts of specialists, even as the stones, need a mind to marshal them into an ordered unit and thereby give them significance."

Evidently the bureau feels that the situation demands a departure from the old procedure of things and the reorganization of our naval hospitals to meet the changed conditions incident to modern medicine. In this hospital the change in organization has been accomplished and the office of professional assistant to the executive has been established.

With the development of systematized group medicine functioning under the direction of a coordinating influence narrow specialism has been made uncomfortable, the activities of the various sections have been brought into harmony for the purpose of working as a team toward a common end. The period of undetermined diagnosis has been greatly reduced, the character of the professional papers and discussions show a broader field of vision, and the diagnostic work indicates a fuller comprehension of the necessity for a combined effort of the various departments before rendering a decision. During the Monday group diagnostic clinics special cases requiring group analysis have been brought up for discussion. We have learned in these discussions the necessity of a complete anamnesis, of a thorough physical examination, and the importance of coordinating and interrogating the reports submitted by the special domains. We have learned more, we have learned that group diagnosis means the coordinated understanding of the patient based upon a comprehensive investigation of every part of the body, no matter how remotely it may appear to affect the final diagnosis.

At times it may have occurred to you that in our group diagnostic work and in the professional papers presented we may have unduly emphasized certain types of cases. Thus we have frequently dwelt upon the diagnostic pitfalls of abdominal conditions. But as a result we have learned that chronic appendicitis, instead of being an easy diagnosis, is oftentimes one of the most difficult. We have shown that one should be on guard for tabetic gastric crises when considering the diagnosis of gastric ulcer, and we have learned the necessity of more frequent urologic examinations in abdominal diagnosis. It has been my experience that the differential diagnosis be-

tween gastric ulcer, gastric crisis, gall bladder conditions, chronic appendicitis, and urologic lesion have more than any other series of cases tested the diagnostic skill of the group, and as the result of our work in abdominal diagnosis we are forced to agree with Seneca, the philosopher and tutor of Nero, that "a thing is never too often repeated that is never sufficiently learned."

Mistaken diagnoses have not been infrequent—yet nothing is more instructive than a mistaken diagnosis which is recognized, analyzed, and reflected upon; its informative value is generally much greater than that of a correct diagnosis, provided the analysis made is carried out systematically and the best talent available is brought to bear upon the problem. It is for this reason that I have selected cases from the wards in which apparently an error in diagnosis had been made and the patient submitted to group investigation. Upon careful analysis of mistaken diagnoses, whether the error has been revealed by the subsequent course of the case, by the application of suitable technical procedures, or by autopsy, the causes may be definitely stated to be—ignorance, insufficient examination, and error of judgment. Our experience would indicate that of the three conditions mentioned insufficient examination will account for the greatest number of mistaken diagnoses. Ignorance should play little or no part in our work, and errors of judgment will occur with any of us. In our group diagnostic work insufficient examinations have been dwelt upon and condemned. A diagnosis must be complete, i. e., the examiner must go over the patient's whole body and not simply investigate a single organ to which his attention has been drawn by the patient's statements. Yet there is unfortunately a too general tendency to confine one's examination to some particular region, organ, or system, to which attention has been attracted by a major symptom. During the past year a patient was admitted into the hospital with epigastric pain and vomiting; the blood Wassermann and urinalysis were negative. Ulcer of the stomach was determined and the patient placed on Sippy treatment. Neither the pupils or reflexes were examined nor a spinal puncture done, or the case referred to the urologist to determine the presence of a tabetic bladder, which, as you know, is one of the earliest signs of tabes dorsalis. Had these procedures been accomplished the diagnosis of gastric crises of tabes would have been made, as subsequent events showed.

Another patient was admitted with vomiting, abdominal pain, and apparent rigidity in the lower right quadrant; his urine was not examined, though actually it contained albumin, 3+ leucocytes, and red blood cells. The patient was operated upon for appendicitis. A delayed urinalysis, cystoscopy, and pyelogram determined the true condition to be a renal calculus.

Still another case was admitted to the hospital with the diagnosis of acute appendicitis; there was pain in the lower right quadrant, and vomiting. The patient was operated upon for appendicitis. Further examination at a later period elicited tachycardia and tremor. The case was finally determined to be one of hyperthyroidism.

In order to emphasize the fact that we may profit more by our mistakes than by our virtues and also to acknowledge my part in the incrimination of insufficient examinations, the following instance is recited. A little boy was referred to me for diagnosis. He had an evening rise of temperature for 10 days. There was a history of night sweats, loss of weight, afternoon flush, and cough. There was no history of pleurisy or hemoptysis. The physical examination was negative and the sputum did not show tubercle bacilli. The X-ray examination showed evidence that was very suspicious; there was definite clouding of the apices, which, in conjunction with the symptoms enumerated, led to the diagnosis of pulmonary tuberculosis. Subsequently definite signs of frontal sinus involvement changed the diagnosis and the patient made a rapid recovery under appropriate treatment for that condition. As the result of this case Doctor McIntire, in charge of the eye, ear, nose, and throat department, started investigations in regard to the differential diagnosis of pulmonary manifestations and infections of the nose and accessory sinuses, and his report of 37 cases is original work and the sort of effort which goes far toward the good reputation of the hospital.

In an endeavor to minimize mistaken diagnosis and to encourage the complete examination of the patient we have formulated certain professional doctrines, based upon our own experience and the experience of others. These doctrines have been adopted only after thorough consideration, and they have the approval of the commanding officer. By the term "professional doctrine" is meant the carrying out of a predetermined procedure under certain conditions. A medical officer may do many other things, but these things he must do. Some of the professional doctrines which have been established in this hospital are as follows: A blood Wassermann is performed on every patient admitted; all venereal sores are submitted to dark-field illumination; in every case of syphilis a spinal Wassermann is done before discharge from the hospital, unless the patient seriously objects. Whenever a patient is admitted a routine chemical and microscopical examination of the urine is accomplished; a culture is required in every case admitted with the diagnosis of acute tonsillitis. An examination for intestinal parasites is conducted in Asiatics. Every case of fistula in ano is referred to the medical section for an examination of the lungs to determine if pulmonary tuberculosis

exists. Every case in which the diagnosis of pulmonary tuberculosis is not proven is referred to the ear, nose, and throat section for an examination of the nose and accessory sinuses. An examination of the pupils is required in every patient admitted to the hospital, and if the pupils are found to be abnormal, even though the blood Wassermann is negative, a spinal Wassermann is performed. When a spinal puncture is to be made the case is first referred to the ear, nose, and throat service in order to determine the amount of choked disk. If more than two diopters is present the puncture is abandoned. The presence of chronic focal infections is determined as the result of an examination of the head as a whole, and not of some particular part, as the teeth, tonsils, and so forth. Focal infections of the teeth are determined only after all the teeth have been X-rayed. This doctrine is required because in fully 50 per cent of cases the sites of focal infection of the teeth fail to present any signs or symptoms except as the result of an X-ray examination. It is a procedure recommended by the Mayo Clinic. Blood-sugar estimations are required in every case of diabetes mellitus. Phenolsulphonephthalein estimations are made in all cases of nephritis, and if found to be lower than 40 per cent a blood urea estimation is determined. Before performing a nephrectomy the kidney function of the remaining kidney must be accomplished. The coagulation time must be determined prior to tonsillectomies.

Symbols are employed in reporting the degree of focal infection, the degree of albuminuria, and the degree of microscopical pus or leukocytes in the urine.

In a paper on group diagnosis read before this conference six months ago, it was stated that the character of the professional work performed can not rise above the mean between the best and the poorest individual in the group. Experience has emphasized this point. Narrow specialization tends to impress one with an undue satisfaction in regard to the character of the work one is performing; individualism and the art of medicine take precedence over team work and the science of medicine. Frequent association and a more intimate insight into the work being accomplished by the other departments tend to correct this situation; new ideas are developed and old errors corrected. In our group work we have done well if we have kept in mind the comment of Camille Flammarion that "Free and loyal discussion is necessary to conquer the truth."

The educational policies instituted by the commanding officer include biweekly conferences, the Monday group diagnostic clinic, and daily clinics given especially for visiting medical officers. At the commanding officer's biweekly conference, professional papers are presented, interesting cases demonstrated, and pathological speci-

mens exhibited. These professional papers are a part of our effort to keep abreast of the times and to provide each medical officer with some special field of reading and investigation. The experiences encountered in our hospital work probably excel in value those occurring in any other line of endeavor in our naval career, and the true value of this experience is not approached unless it is portrayed in staff conference, by professional papers and discussions.

With the intention of stimulating a renewed interest on the part of the staff in the preparation and discussion of professional papers, eminent civilian physicians from San Diego and near-by cities have been invited by the commanding officer to take part in our conferences. This interchange of ideas has prevented our isolation and brought us in closer touch with our colleagues in civil life. This procedure has undoubtedly been of mutual advantage and it is believed that the civilian physicians may have obtained a more favorable impression of the character of the professional work performed by the Naval Medical Corps, while we in turn have benefited by their broader field of experience along certain lines of work. To all of these conferences we have invited the 20 or 30 medical officers on duty in this vicinity. In addition, the commanding officer has established daily clinics by the different departments in the hospital for the purpose of permitting visiting medical officers to assist at major operations and to take part or actually perform such minor operations as tonsillectomies, spinal punctures, kidney function tests, skin sensitization tests, basal metabolism estimations, and duodenal intubations. Thus it has been made possible for medical officers ashore and afloat to keep in touch with the latest diagnostic procedures and with their cases transferred to the hospital.

Finally, the hospital is developing an attractive medical library, consisting of recent books and current medical journals. This library is primarily for the benefit of the hospital staff, but it is also available to visiting medical officers. A librarian is present daily from 10 to 4 o'clock and all medical officers are invited by the commanding officer to take advantage of this opportunity to keep themselves in touch with the recent medical literature.

In presenting this paper I have endeavored to indicate that during the past year we have made real professional progress, that a premium has been placed upon the science of medicine rather than the art of medicine. I have also tried to impress upon you that our advancement has been the result of the progressive policies instituted by Capt. F. W. F. Wieber and Capt. H. C. Curl, but of equal or even greater importance has been your part. By intensive work along special lines, combined with a greater insight into the work of the other departments, and a willing cooperation, you have made

it possible to develop a team which has had for its objective the best and most up-to-date methods of diagnosis and treatment. No hospital can have a better mission and no naval hospital can accept a lesser one.

In the accomplishment of this mission are we losing sight of our greater mission—that of our specialty as naval medical officers, which after all is a superspecialty requiring a working knowledge of all branches of medicine and a special knowledge of particular fields of work, such as military surgery, tropical medicine, and hygiene and sanitation? We who have worked together this past year fully realize that it has necessitated hard work and study to maintain the standard we have set at this hospital.

In the special domains of urology, roentgenology, dentistry, pathology, and eye, ear, nose, and throat, we have become impressed with the fact that special training seems imperative to meet the obligations of group diagnosis. These specialties require a scientific application of histology, pathology, bacteriology, combined with a thorough appreciation of their relations to systemic manifestations. Under such circumstances it would seem that the greatest problem which confronts us in the future is how will we meet the increasing responsibilities of specialization in our hospital work and at the same time keep ourselves sufficiently in touch with the other branches of medicine to meet our greater obligation—that of naval medical officers.

In an excellent article entitled "The Military Surgeon as a Specialist" in the December Military Surgeon, Capt. Dudley N. Carpenter invites a discussion as to the need of specialists in the service. In the concluding sentence Doctor Carpenter remarks that "When we further specialize the military specialist it should be with a clear understanding of how to guard against the danger of overspecialization." This is sound advice with which we may all agree, but his comment—"if a young medical officer elects to devote special attention to any one branch it should not be at the expense of the other branches"—is an ideal that can hardly be accomplished in modern hospital work. It would seem from our experience that the intensive applications along special lines must be at a considerable sacrifice of the other branches of medicine.

The policy set forth by Commander Harold W. Smith seems to meet the requirement of hospital efficiency and at the same time fulfill our obligations as naval medical officers. Smith indicates the bureau's policy when he states that "rarely, and then only under special circumstances, will officers just graduated from the Naval Medical School be launched forthwith on a career of specialism. Instead, those officers who have been in the service for a period of

several years will, at the expiration of a cruise, be given instruction in the subject they have chosen, and subsequently will be ordered to duty where they may practice it as a specialty." Smith further remarks that "specialization can not be allowed to unfit a medical officer for general duty, nor to exempt him from it."

Alfred Martinet, the eminent French diagnostician, emphasizes this viewpoint in a recent publication in the following manner: "One might apply to specialization in medicine the well-known apology of *Æsop* regarding the spoken tongue—it is at once the best and worst of all things." Martinet continues thus: "Let the young practitioner pray to heaven that he may specialize as late as possible, or at least only after having acquired very extensive and well-grounded general knowledge, and let him strive throughout life to keep in touch with all the fields of clinical medicine."

How then may we carry out the bureau's policy and at the same time meet the requirement of intensive application so necessary in modern hospital work? It would seem that this might best be accomplished by continuing to associate in clinic and conference, and at stated intervals requiring medical officers doing special work to perform surgical procedures common to the naval service. In this manner medical officers already trained in the general duties of a naval career may keep in touch, so that when again called upon, to meet their paramount duties as naval medical officers, they will be found ready.

THE SURGICAL ABDOMEN.¹

By G. W. SHEPARD, Lieutenant Commander, Medical Corps, United States Navy.

By the term "surgical abdomen" we understand that which embraces those conditions, and more especially acute conditions, within the abdomen which require the immediate consideration of the surgeon and often prompt operation. It is a condition demanding most careful and discriminating judgment, and unfortunately occupies a high place in mortality statistics which can only be reduced by timely operation when needed, and also, which is just as important, postponement of operation in many cases until a more suitable time.

A variety of diseased conditions may cause it, the more common of which are perforation of gastric, duodenal, and typhoid ulcers; intestinal obstruction; acute infections of the appendix and gall bladder; and acute pancreatitis.

While the surgical abdomen is an acute affair, the conditions which may cause it have usually existed for some time and are thus of a

¹ Paper read at the biweekly conference of medical officers held at the United States Naval Hospital, San Diego, Calif., Dec. 28, 1922.

chronic nature. This is of great assistance in making a diagnosis when, if a careful history is taken, bearing in mind all the possible causes, information may be obtained which will be of great value. This is not always the case, however, as occasionally the acute abdomen results from conditions which are not so easily recognized. Among such we may mention mesenteric thrombosis, or acute obstruction due to internal strangulation by congenital bands or a congenital hole in the mesentery or diaphragm. Deaver (1) reports a case of a man who "while cranking a Ford automobile was suddenly seized with acute abdominal pain, which necessitated his remaining in bed several days under the care of his physician. The pain left and he made a rapid recovery. Six months later when again cranking his automobile he was attacked by the same set of symptoms which this time, however, did not disappear. He was brought to the hospital in a dying condition. No operation was performed. The post-mortem showed a gangrenous coil of intestine protruding through a congenital hole in the mesentery."

Another division of this subject embraces the acute traumatic abdomen. Many of these cases give rise to great difficulty in diagnosis. Every abdomen which shows a penetrating wound should be opened. There is hardly an exception to this. There will be found cases in which the viscera have in some way miraculously escaped injury but the surgeon can not afford to depend on this chance. I remember in my internship of assisting at operations on two apparently quite similar cases—both revolver-shot wounds of the abdomen in young men. In one, the wound of entrance was in the flank and the exit just beneath the umbilicus. The abdomen was opened and it was found that the bullet had not entered. By some fortunate chance it had taken a curved course between the muscles and skin. The other case showed the wound of entrance in a similar location in the flank and the exit was just above the pubis. In this case the small intestines was perforated in six places and the fundus of the bladder was grooved. Neither case showed any symptoms of shock and neither of them complained of abdominal pain. Deaver (1) states that he has operated on cases showing "complete section of the bowel, although the patient who had been run over across the abdomen by a heavy vehicle, showed no alarming symptoms nor any external evidence of injury." Severe blows and falls on the abdomen may similarly cause disastrous injuries to the viscera, although there may be little evidence externally to show it. Where there is any question, these abdomens should be opened early. If no injury is found very little is lost. On the other hand, either a perforation or hemorrhage demands immediate attention.

In a case of perforated gastric or duodenal ulcer we have exhibited one of the most dramatic of abdominal crises. The sudden

agonizing pain, boardlike rigidity, early extreme tenderness, moderately rapid pulse, very little if any elevation in temperature, and some degree of shock make the diagnosis most suggestive. Partial or complete obliteration of the liver dullness is also a very strongly corroborative sign when present. The pain differs from the coliclike pain of gallstones, appendicitis, and renal colic in that it is constant. A history of previous attacks of indigestion makes the diagnosis quite sure. There are occasional cases of perforation without antecedating symptoms but these are rare.

The treatment is, of course, immediate operation and closure of the perforation. This should be done no matter what the degree of shock. As the peritoneum is opened, free fluid wells up, and with bubbles of gas, the diagnosis is clinched. It is well to aspirate the fluid. Deposits of fibrinous exudate on the viscera, which are held aside by moist pads, will assist in locating the point of perforation. The repair is best made by infolding the perforation with fine chromic catgut. Some surgeons, in addition, do a gastroenterostomy, but unless there is some special pathology which requires it, such as the possible production of a stenosis of the duodenum, it is best to be content with simple closure of the perforation. If the leakage has not been too great and a careful peritoneal toilet can be made, deep drainage is unnecessary and may court trouble. Simple cigarette drains through the belly wall are sufficient. In those cases where the leakage has been widespread, additional drains through stab wounds in the lumbar gutter may be advisable. The great majority of these cases when operated on within the first 12 hours recover.

The surgical abdomen of intestinal obstruction likewise demands immediate operative relief. Finney (2) reports 217 cases from the Johns Hopkins Hospital that were operated on, with 141 recoveries. Twenty-one cases were operated on within 12 hours, with 20 recoveries and 1 death, a mortality rate of about 5 per cent. The group operated on in the second 12-hour period showed a mortality rate of 11 per cent, while the mortality of the group operated on in the second 24-hour period showed the high rate of 31 per cent. These were cases of acute complete obstruction and strikingly show the necessity of early recognition and operation.

Intestinal obstruction is usually classified as acute or chronic and may be complete or partial. It may be due to a variety of causes, among which are: Intussusception, volvulus, internal strangulation, foreign bodies within the gut, tumors, bands and adhesions, paralytic ileus, and congenital defects. The symptoms in a typical case are quite characteristic, but often in this condition as in other diseases the picture is not typical. The most important and common symp-

toms are pain of sudden onset and colicky in nature, vomiting, abdominal distention, and constipation. Later on symptoms of shock appear. The pulse becomes rapid. The temperature becomes subnormal. The patient exhibits an anxious expression with pallor and cold sweat. There is excessive thirst and a scanty excretion of urine. The character of the vomitus becomes stercoraceous. If relief is not obtained, death usually occurs within a week, often in a few days.

The cause of the fatal issue is absorption of toxins from the obstructed bowel loops. This is manifested by the fact that when material from obstructed bowel loops is injected intravenously with proper technique into normal dogs, death is caused with the characteristic symptoms of intestinal obstruction. By far the greatest single cause of intestinal obstruction, probably 50 per cent, has its origin in adhesions from previous operations. This cause can be reduced by gentle handling, surgical cleanliness, and the restricted use of gauze drains. Paralytic obstruction, postoperative, frequently is very difficult to differentiate from mechanical obstruction. This variety is occasionally seen following operations on the kidney and urinary tract and is probably due to paralysis of the sympathetic nervous system.

The operation required for the relief of intestinal obstruction depends upon the condition found. It may demand anything from a simple division of an obstructing band, to the resection of many feet of gangrenous gut. In desperate cases a simple enterostomy and drainage above the site of obstruction may be a life-saving measure, or enterostomy may be required for drainage purposes in addition to other reparative work.

Quoting Finney (2) "Early diagnosis is the most important factor in the whole category. It is better that the operation should be done early than well. Better a poor operation on a patient in good condition than a good operation done on a patient in poor condition."

Acute cholecystitis is usually accompanied by gall stones. Its symptoms are severe colicky pain, tenderness to pressure, and muscular rigidity in the right hypochondrium. Jaundice may, or may not, be present, depending upon the location of an obstruction, if any, in the bile ducts. There is fever and a leucocytosis. The pain is caused by stones or inspissated bile and may be excruciating in intensity and radiating from the epigastrium or right hypochondrium to the back and right shoulder. This is accompanied by vomiting, sweating, and sometimes collapse. With progression of the infection we have suppurative cholecystitis and cholangitis, which necessitates the surgical removal of any obstruction in the ducts and drainage of the gall bladder.

Gangrenous gall bladders should be removed, but if not too seriously damaged drainage alone should be done. Stones are not infrequently overlooked, and should a secondary operation be required following a cholecystectomy, the changed topography with attendant adhesions will add greatly to the difficulty. Also, drainage has a beneficial effect on the cholemia as well as on the pancreas, which is so commonly involved in this infection.

Acute appendicitis is by far the most frequent single cause of the cases of surgical abdomen seen in the Navy. The age and sex of the personnel contribute to this. As a rule the diagnosis is not difficult, although there are other diseases which simulate it very closely and at times a definite diagnosis before operation can not be made.

In the typical case we have pain, which in the beginning is colicky in nature and radiates outward from the umbilicus or epigastrium, later it becomes localized in the right lower quadrant. The pain is frequently accompanied by nausea and vomiting. There is localized tenderness to pressure over McBurney's point, and muscular rigidity, often intense, over the same area. With this there is usually a leucocytosis, which is a sign of some value when considered with the clinical phenomena. The pulse rate and temperature give us little information. A history of previous similar attacks or of attacks of indigestion is of considerable value.

As to the condition of the appendix within, no prudent surgeon will make a prediction. We have all removed appendixes which after but a few hours' involvement and in which all clinical symptoms were comparatively mild were found to be in a surprising condition of gangrene and perforation, and on the other hand many cases exhibiting extreme clinical symptoms produce an appendix showing much less pathology. It is this uncertainty of the conditions within which demands prompt and early operation; the only contraindication is the presence of some other grave malady which will render operation extremely dangerous.

There are certain disorders which give rise to symptoms which closely simulate the surgical abdomen. Some of these on casual observation are quite confusing, while others at times require careful study in order to differentiate. A beginning pneumonia with diaphragmatic pleurisy may cause pain confined to the abdomen and abdominal rigidity. This has frequently been mistaken for appendicitis. The gastric crises of tabes are often mistaken for a surgical abdomen.

In cases of suspected acute appendicitis one should always look for a beginning epididymitis, and occasionally he will be rewarded by finding it as a cause of the symptoms shown. Acute gastroenteritis is often difficult to differentiate, and unnecessary operations have

been performed; but more frequently, I think, the reverse is the case, and true surgical cases have been diagnosed gastroenteritis and a much-needed operation postponed until too late.

Another frequent diagnostic pitfall is in cases of renal diseases. Calculus, pyelonephritis, and hydronephrosis all have at one time or another as their chief symptom, pain; and this pain is very frequently confined to the abdomen alone. Cecil (3) in an article on "Abdominal pain in diseases of the kidney and ureter," gives a critical review of 300 cases. Of the cases of calculus of the kidney or ureter, comprising 67 of the series, the pain was purely abdominal in 28 per cent, and in 13 cases, or 20 per cent, it had been so misleading that the patients had been previously subjected unnecessarily to abdominal operations—chiefly appendectomies and gall-bladder drainage. Of the cases of hydronephrosis without stone, abdominal section had been done on 30 per cent.

All cases of abdominal pain which are in any way obscure should be referred for a roentgenographic examination of the urinary tract and if the urine shows pus or blood a complete urologic examination should be made.

As to whether and when to operate. The dictum that cases of perforation, obstruction, and hemorrhage within the abdomen should be operated on immediately, stands without contradiction. But when dealing with the surgical abdomen, which is due to inflammatory conditions of the peritoneum, the decision is not so readily arrived at. The keenest surgical judgment must be brought into play.

When seen early and the infection is localized, early operation is by far the safest procedure. By removing the focus of infection at this stage, the development of a diffuse peritonitis, which is the death-dealing factor in all these cases, is checked. But, if not seen until the infection has spread throughout the abdomen, and an active general peritonitis has developed, it is more than likely that delay in operation offers the best chance for recovery.

The most intelligent management depends, of course, on a correct diagnosis. In making a diagnosis, I can not emphasize too strongly the necessity of getting a careful and accurate history. This history, followed by a painstaking examination of the patient, and we have exhausted our chief means of making a diagnosis. The laboratory and X ray will give us little assistance as they do in the more chronic ailments. The blood count should only be taken as a corroboration and never as a substitute for clinical experience; otherwise we will frequently be led astray, as a high white count does not always mean pus, and a low count is occasionally found in the presence of an active infection.

The earlier these cases are seen the easier the diagnosis will be made; the details of the history can be more readily obtained and the clinical signs can be more clearly differentiated.

It is these late cases with an obscure diagnosis and a diffusing peritonitis that are often best treated, even at the risk of censure for the delay, by the Fowler-Ochsner-Murphy plan and by waiting for localization before operating. W. J. Mayo (4) says: "Much harm has resulted from the failure to recognize the difference between the stage of contamination which is the immediate result of perforation and can be successfully combated by early operation, and a spreading peritonitis resulting from the infection. The cause of the peritonitis is no longer the chief concern but rather the peritonitis itself. The results of plunging into the abdomen too late adequately to cope with the cause of the peritonitis and too early to aid Nature's attempt to repair have too often resembled the proverbial 'green Christmas' in fattening the graveyard. When localization is effected the abdominal distention disappears, the vomiting stops, and flatus is expelled; then an operation may be considered to have met a definite indication."

It has not been possible in a paper of this kind to do more than generalize on this important subject. While there has been great improvement in the recognition and management of the acute surgical abdomen in the last 15 years, many of its problems are yet in dispute or at least not agreed upon. It can be said that the outcome to these patients, more than to most others, hinges upon the critical study by, and prompt decision of, a surgeon of mature clinical experience.

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INTERNAL DERANGEMENTS OF THE KNEE JOINT.¹

By JOHN DUNLOP, M. D.

Special interest in this subject has been stimulated by the vast amount of material presented by the exigencies of the war; and my personal interest has been further increased by my association,

¹ Paper read at the biweekly conference of medical officers held at the United States Naval Hospital, San Diego, Calif., Dec. 16, 1922.

while in the service, with Sir Robert Jones, of Liverpool, who is acknowledged to be the greatest authority on this subject.

In order to understand the mechanism of derangements of the knee joint it is essential to review the functions of the important structures which control the actions of the joint. I will not go into detail further than is necessary, nor will I mention the many less important structures.

Of the soft tissues which play an important rôle in stabilizing the knee, the crucial ligaments are the strongest and probably the most important. They not only carry the greater part of the weight of the lower leg, but control its movements in all positions of the joint, especially when the knee is flexed, when most of the other structures are relaxed and off guard. In the straight position of the knee there is normally practically no motion, abduction of the leg and external rotation being largely prevented by the strong internal lateral ligament. This function of the ligament is also assisted by the wedge-shaped external semilunar cartilage. These structures lose this function largely as flexion takes place, so that when the knee is at right angles the internal lateral ligament has completely lost its power, and there is normally an amount of external rotation and lateral movement that is perceptible to palpation over the knee. Abduction of the lower leg is likewise prevented by the external lateral ligament and the internal semilunar. The great majority of knee-joint injuries take place when the lower leg is forcibly abducted and externally rotated or, which is the same thing, when the femur is forcibly internally rotated. To the readiness with which this force can be applied is probably due the greater strength of the structures which resist it. For instance, the internal lateral ligament is very strong and several times as wide as the external and it is more intimately connected with the joint capsule, the two forming practically one dense tissue to which the internal semilunar cartilage is firmly attached at its periphery (a point of great interest clinically, in considering the injuries of the internal semilunar cartilage), whereas the external lateral ligament is long and cord-like and entirely separated from the capsule. The external cartilage is almost circular, only attached at its periphery by the loose capsule, but more firmly attached at its ends which are well protected because of being placed almost at the center of the joint near the tibial spine, and are thus little influenced by the strained positions into which the leg is forced.

The internal cartilage, on the other hand, being so firmly attached to the dense and short internal lateral ligament, is readily deranged by any force that stretches or tears the ligament, and it has been noted clinically that the most common injury to the cartilage is a

break which occurs at the anterior margin of the internal lateral ligament, which corresponds to about the center of the cartilage. Another injury to the internal cartilage which is not infrequent is a longitudinal split due to its rather weak attachment in front near the tibial crest. Hyperextension of the knee is controlled by the posterior ligament of the knee joint and the posterior crucial, whereas flexion is limited only by contact of the fleshy elements.

A classification of the internal derangements may include:

1. Injury to the semilunar cartilages.
2. Injury to the internal lateral ligament.
3. Injury to the crucial ligaments.
4. Tabs from the infrapatella fat pads.
5. Villous arthritis.
6. Loose bodies.
7. Exostoses.
8. Rupture of the tibial tubercle.
9. Osteochondritis dessicans.
10. Hypertrophic arthritic spurs.
11. Erosions of cartilages.
12. Dislocating patella.

I believe that it is frequently impossible to differentiate between many of these types, but I shall attempt to note a few points which have been found helpful.

1. *The semilunar cartilage.*—Sir Robert Jones found in his series of over 500 operative cases, published in 1909, that the external cartilage was the seat of trouble in but 24, or about 5 per cent of these cases. This can be readily appreciated when we consider that the external cartilage is not bound down firmly as is the internal, and also that, due to the conformity of the knee and its movements, the internal lateral ligament is subject to stress every time the leg is abducted or forcibly externally rotated; and it may be further said that every time the internal lateral ligament is ruptured or put on a stretch, the position and function of the internal cartilage is changed. Should the displacement, which is almost always toward the spine of the tibia, be severe enough, or should a portion of the cartilage become dislodged and turned on end, it produces the sudden locking of the joint in the flexed position which is so characteristic of the affection. No doubt all of you have seen this take place on the baseball or football field. The individual limps from the field with the knee partially flexed, or it is reduced by some assistance in the way of forcible flexion and extension. At times a reduction is difficult and even impossible. I have seen one patient go three weeks unable to obtain complete extension, notwithstanding an attempt at reduction under an anesthetic. In such cases unquestionably a portion of the cartilage has been turned back and acts as a wedge. Sir Robert Jones makes the statement that no cartilage is reduced *unless*

voluntary extension is complete. Such a set of symptoms is that of *rupture* of a cartilage, and not merely of a loose cartilage; by which I mean where the abnormal excursion of the cartilage is such that it produces symptoms. The diagnosis of deranged cartilages is made largely from the history unless seen in the actual condition of displacement, which is seldom. Sir Robert Jones makes the following differentiation: If the point of tenderness is at the joint line, the trouble is with the cartilage; if above or below the joint line, at the attachments of the lateral ligaments, the trouble is with the ligament. He believes there are many cases of internal lateral ligament derangements where the cartilage is not affected. Further, in rupture of the internal lateral ligament, abduction of the leg at the knee is increased as well as external rotation.

In the cases of injury of external semilunar cartilage the history is suggestive, the point of pain being at the joint line, the point of its attachment. Jones makes two other very apt statements. First, that the displaced cartilage is seldom felt, because any displacement is inward toward the center of the joint; and second, that if there is trauma sufficient to displace the external cartilage, there is usually also trouble with the internal—that is, meaning that if the force is sufficient to injure the external cartilage, the internal attachment being so much more firm, participates.

The conditions probably most nearly simulating a derangement of a semilunar cartilage are villous arthritis and trouble with the fat pads. Should these projections of the synovial membrane and fat pads be sufficiently long they get caught between the bones, and at times the pain and "catch" is quite like that of the semilunar catch, the difference, however, as suggested by Goldthwait, being that with the villous condition the individual is able gradually to straighten his own leg, whereas in the cases of injury to the cartilage he must be assisted. Villous changes are seldom present without irritative changes within the joint, as they are a product of such irritation, being a thickening and great increase in size of the normal papilli of the synovial membrane, whereas with the fat pads I have found them only as a result of trauma, or more especially where there is a general increase in the fat of the body. In the case of the villous condition, the capsular area of the joint on palpation has been likened to a bunch of worms (fishing bait), whereas in the increase of the fat pad, there is a soft swelling to the side of the patella tendon, which, following a nipping, is tender on pressure, locally. In all of these conditions following the injury there is an increase in the amount of joint fluid. In all there is a recurrence of symptoms more or less acute. In the case of cartilage and ligament there is usually an initial history of injury and

frequently the position of the leg can be described when the "give" takes place.

Perhaps in this group may also be placed the rupture of the crucial ligaments, of which I have had four examples. All were the result of great trauma with the knee flexed, in which other structures participated in the injury. In those cases where the injury principally concerns a crucial ligament there is a to-and-fro motion of the tibia on the femoral condyle in the flexed position of the knee, and also in the straight position if there is sufficient accompanying injury of the lateral ligaments which normally are tense and stabilize the knee in the straight position. The instability accompanying the rupture of a crucial ligament is one of the most crippling things which can happen to a knee joint, and, so far, little has been accomplished in its treatment, unless spontaneous repair takes place immediately after the injury.

Q 2. *Loose bodies or joint-mice.*—The loose or partially attached bodies are of not infrequent occurrence, their chief interest being their elusiveness. One may find them to-day and they will be gone to-morrow, but always to return. They may be as small as rice grain, containing no bone, or they may be larger than a pigeon egg and contain much lime salts, throwing a distinct shadow on the X-ray negative. They may be single or multiple. They may give the proverbial recurrent "catch," especially if attached by a pedicle.

Hypertrophic spurs may and do appear at any of the cartilaginous edges, usually the result of some form of injury. This injury may be the overaction of tendons, from knocks and bruises, or the result of the action of bacterial or chemical toxins. They are found especially at the upper and lower surfaces of the patella at its ligamentous attachments, or at the periphery of the head of the tibia, their chief significance depending on a mechanical irritation of the joint synovia, causing local pain and synovitis of a chronic nature with fluid.

7. The exostoses are quite different. They seem to be more of a congenital origin or development and are only of interest symptomatically when they interfere with the normal function of some muscle or tendon, in which case removal causes immediate relief. It is possible that Rosenow's recent work on myositis ossificans may throw some light on the etiology of such cases.

One of the most interesting derangements is that of recurring dislocation or slipping of the patella. This condition is due to an abnormality of the femoral condyles which normally form a groove in which the patella slides. When the attached ends are well out of line with this groove the tendency is for the patella to be drawn outward from its usual articulating surface. This condition is usually found in women who, as you know, are almost always more or less

knock-kneed. Many operations have been devised, the most prominent of which are:

1. Building up the outer condyle by means of a bone graft.
2. Separation and transfer of the attachment of the tibial tubercle attachment of the quadriceps tendon to the inner side of the front of the tibia subperiosteally.
3. Splitting of the patella tendon and transfer of the outer half well to the inner side of the tibial crest.

§ Another derangement, and one in which I am particularly interested, is injury to the adolescent tibial tubercle, frequently spoken of as Schlatter-Osgood disease. In a long series of cases studied I found that the symptoms are always referred directly to the tibial tubercles, that they always come on suddenly and follow a strong contraction of the quadriceps extensor group, usually in an attempt to use the muscle in a quick, forceful way, as in football, in kicking the ball, or in trying to avoid an accident. It always occurs in the individuals with especially strongly developed quadriceps and always at the line of cartilage between the center of ossification of the tubercle and tibial wall, just before ossification takes place between the tongue-like process of the tibial head and the shaft at a time when the cartilaginous film is the thinnest and least likely to resist a sudden strain. Few cases have been reported in girls—and, in fact, I believe mine were the first—due, no doubt, to the usual poorer muscular development of girls and because they are less likely to be exposed to the activities which occasion the injury. I have also found that in the normal development of the tibial tubercle ossification takes place at an earlier age in girls—from 10 to 13, as does adolescence, while in boys the ossification is often not complete until the eighteenth year, with an average of about 14 years. The treatment of these cases, once the pathology is understood, is *definitely not operative* unless the avulsion is so great as widely to separate the tongue-like process. I believe and have proven in my series of cases that relieving the pull of the quadriceps until ossification is completed is the treatment called for. I believe that this takes place within about six months, as ossification is usually nearly complete at the time of the injury producing the separation, that being the *weakest* period. A further strong reason for not operating is the danger of interfering with the normal ossification centers.

¶ Osteochondritis desiccans is a condition only recently brought to our attention, though described more than 30 years ago by Koenig.

It is one of the conditions which produce loose bodies, and is supposed to be an interference with one of the nutrient end arteries supplying the joint surfaces, with a consequent desiccation of the localized devitalized area producing a free or pedunculated body.

Some of my recent cases go to show without much question that all of these cases are the result of injury to an end artery probably by a destruction or clogging of the vessel, that from that point forward to the surface of the joint a desiccating process takes place following closely the distribution of the supplying vessel which has been injured. This probably is of somewhat slow development, depending on how complete the shutting off of the blood supply has been; finally the affected area remains as a devitalized loose piece of bone. In two instances this loose piece was held in its original bed by the overlying cartilage. When the surface of the affected part was exposed a shriveled area of cartilage was seen, somewhat bluish in appearance. When it was touched with an instrument the mass below was freely movable, the cartilage was split, and the freely movable mass was lifted from its bed, the surrounding bone was slightly eburnated, not a bleeding surface, the loose piece removed had the appearance of any sequestra not affected by infection.

It is possible to make this diagnosis from X-ray examination. I have seen in a perfect stereoset of one case the area from which the loose body came, corresponding exactly with the loose body, which was later proven by operation.

The importance of diagnosis and operative removal of such cases can be best illustrated by the following case: A boy 20 years of age had been injured some two years previously; at first the injury was thought to be of a trivial nature, but as the knee joint began to be troublesome he was taken to another physician, who made an X-ray examination and found what was supposed to have been a fracture, and the first physician was blamed for negligence. As the fracture was supposedly into the joint, little was accomplished by manipulative procedures which were carried on more or less strenuously over a long period of time, the knee gradually becoming more and more painful with less and less motion and continuously increasing in size.

When I saw the boy I found a knee with a history of two years' standing, gradually getting more swollen and painful with use, the movement was restricted in both extension and flexion, and the pain was pretty general throughout the knee, but more acute on pressure at the joint line. There was without question a subacutely inflamed knee joint, the X-rays, which were handed me at the same time, told the story, and to my mind there was no question as to diagnosis. Because of the inaccessibility of the affected area, and because I felt it important to know just how much damage had been accomplished by the former treatment, I made a transpatella incision, and well that I did, for the area would have been wholly inaccessible

from a lateral incision, and I should never have known how much of the joint was good and how much bad.

Other than the local condition previously described, I found the synovia everywhere intensely injected and thickened; in fact, it reminded me of a piece of very thick maroon-colored plush, about three-sixteenths inch thick; other than these findings the joint was quite normal in appearance.

Without this incision I should not have known of the great importance of aftertreatment. I have always thought I knew how to go about aftertreatment of knee joints, but this case taught me one thing—that is, that joints subject to such mechanical insults require exceeding care in restoration, that the time element must be discarded and only such movement be allowed as will *not* in any way cause a continuance of the synovial irritation, and further, that the local blood supply must be so perfect that restoration will be accomplished, for it is only through a perfect reduction in irritation and more copious circulation that healing can take place.

There will be no better place than just here for me to refresh your memory on just what takes place in the healing of injured tissue, whether the injury be mechanical, chemical, or bacterial.

When a part is injured there is a certain amount of destruction of tissue, a certain amount of débris. How do these injured areas get rid of these waste materials and how are they repaired? Only by the function of the blood. All waste products are gathered up and carried away in the so-called venous stream and the new building material is brought in through the arterial blood. Now, if we accept this as the true physiology, then only by increasing local circulation are we going to hasten repair. Therefore anything which increases local circulation without at the same time doing injury is the thing to be employed. I personally believe there is nothing so efficacious as alternating hot and cold water to produce this effect.

I shall now return to the treatment of the more common knee conditions. If an internal lateral ligament continues to give symptoms, localized pain, and lateral movement of the knee in the extended position, a quilting or substitution operation may be undertaken. If we have a knee with the classical "catch" of the semilunar cartilage with the initial injury, reduction by manipulation and a minimum of three weeks' fixation, without weight bearing, followed by gradual resumption of activity, is the rule. If this régime is not strictly followed, we *never* get repair, and the usual history of recurrence starts with slight twinges or definite "catches," with diminishing amount of fluid, with each attack, coming every few days, weeks, or months. The leg can not be relied upon, and to one having to place himself in precarious positions this may mean

danger to life, for at such times there is a temporary loss of control. The fear of recurrence causes a distinct hindrance to activity and, furthermore, the frequent irritation with the swelling set up by the recurrence gradually causes a relaxed knee joint as well as possible villous and hypertrophic changes. In all such recurrences Sir Robert Jones advises removal of the cartilage with full expectation of a complete cure and a normally functioning knee.

Points of interest in performing the operation are:

1. The position of the knee, at right angles over the end of the table, allowing easy manipulation of the joint and employing the weight of the leg to separate the bones.

2. A straight longitudinal incision or, if necessary, slightly curved at the bottom, avoiding as much as possible cutting the lateral structures of the knee.

3. In the removal of the cartilage no *pull* should be applied in attempting to reach the posterior end of the cartilage, as it might be loosened from its moorings and give trouble should it not be all removed. Only as much of the cartilage as it is possible to reach should be freed at its peripheral attachment and cleanly cut across, leaving the posterior end firmly in position.

4. There should be no *stump* of cartilage left at the periphery, where the cartilage is freed from its attachment. I have reoperated upon two such cases where the symptoms were not relieved and where the cartilage was not completely removed by the previous surgeon. I can not but believe that wherever a pretty thorough investigation of the joint is necessary, especially where we are dealing with the elusive loose body, with villous arthritis and injury to the crucials, the incision of choice is to split the patella longitudinally. In that way everything in the anterior chamber of the knee joint can be brought into plain view and a very thorough surgical procedure undertaken; there are no forces to interfere with quick union of the patella, the opposition of the fragments being controlled by kangaroo tendon sutures. There is little, if any, pull laterally on the fragments, and I find the soft sutures quite sufficient and extremely easily placed and in addition promote more perfect coaptation. It is important to remember that more of the knee joint is thus exposed, and that faultless technique is essential to the success of the operation.

So far as repair of crucial ligaments is concerned, it is unsatisfactory at best, probably because of their intricate construction and their tenseness at all times, leaving little or no margin for repair work. A number of repair operations have been done, notably by Brackett, of Boston, and Hay-Grooves, of Bristol. Brackett did a direct suture and Hay-Grooves tried a most unique procedure, taking the semitendonosis tendon and passing it through a drill hole in the condyle of the femur and attaching it to the head of the tibia. Much

was expected of this procedure, but we believe the use of a knee cage is the best treatment at the present stage of operative development.

There is but one way to restore the synovia of a knee joint to its normal appearance and function, and that is to follow, as a matter of routine, the course I described briefly in the case of osteochondritis desiccans.

There are certain things to be done and others never to be done.

In the first place I will mention some things never to be done. Never *really* produce pain; if a manipulation is to be done, give an anesthetic and do whatever is necessary in one or two movements; never employ the "pump-handle method."

Never do any more injury than is possible, either by forcible movements (which may be reactive) or by direct massage over the joint capsule. It is a very good plan never to let a masseuse massage over any irritated area, but *around* such areas. Massage may help the surrounding muscles to do their work better, and active movements by the patient are by far and away the best way to restore movement in any joint.

There are few patients who will not stop short of injury.

I try to make my treatments follow somewhat of a routine, varying, of course, to suit individual needs, but it is as follows:

1. Preparation of joint for treatment. By that I mean the employment of the tissues for activity—to soften them. This is best done by heat. It may be given in the form of hot packs, hot soaks, or dry heat.

2. Active and passive movements, the passive only used to educate or persuade the patient into activity. Movement should only be given to the point of pain and sometimes it takes a real psychoanalyst to determine this point.

3. Massage. I like massage to follow activity to help tired cells discharge their waste products.

4. Contrast baths to act as garbage collectors and to bring in the new meal.

Few realize the great importance of keeping up the muscular development about knee joints, and I wish to say just a few words about this very important phase of the situation.

The muscle most responsible for knee-joint activity is the quadriceps femoris, and yet how often is any attention paid to its condition? I believe it is of the greatest importance for function following knee-joint injuries to preserve the full strength of the quadriceps. Seldom is it unwise, and then only temporarily, to start quadriceps development from the beginning. The patient can be taught quadriceps contraction which he can do in any form of splint or extension, the knee joint does not have to be moved and if effectively done will preserve the power of the quadriceps. When the

muscle once atrophies from disuse it is a question of months or years, if ever, before full power is restored. The other muscles which have to do so much with flexion, such as the hamstrings and the gastrocnemius, must also be kept in condition, especially the latter, for if we get contraction of the gastrocnemius there is difficulty in fully straightening the knee with the heel on the ground.

These things can usually very easily be arranged and should be a routine or standing order in the hospitals.

HYPERTHYROIDISM.¹

By J. B. POLLARD, Lieutenant Commander, Medical Corps, United States Navy.

By the term hyperthyroidism is meant the clinical syndrome resulting from the presence in the body of an excess of thyroxin, which Kendall has identified as the active principle of the thyroid gland. This syndrome is characterized by an increased basal metabolic rate and by intoxication, clinically evidenced by nervousness, tremor, tachycardia, loss in strength and weight and, in the later stages, myocardial degeneration. Plummer has estimated that from 12 to 14 milligrams of active thyroxin must be present in the body to maintain the basal metabolic rate at the normal level and that the amount used is about one half a milligram daily. He has also demonstrated that symptoms of hyperthyroidism can be produced in a normal person by the administration of an excess of thyroxin and that the syndrome thus produced can not be distinguished from that caused by an overactive adenoma of the thyroid gland.

As we all know, there has been a great deal of work done recently on metabolic diseases as a whole, and this is particularly true in regard to those in which there is involvement of the thyroid gland.

Lieb, Hyman, and Kessel have made some very interesting investigations as to the relationship between exophthalmic goiter and a certain symptom complex, which they believe to be the result of stimulation of the involuntary nervous system. In other words, they believe that the manifestations of exophthalmaic goiter may be divided into the metabolic disturbances as evidenced by increased basal metabolic rate, and the symptoms which they term "sympathomimetic," such as tachycardia, exophthalmos, tremor, sweating, etc. The term "sympathomimetic" is used because symptoms such as enumerated above can be produced by stimulation of the thoracolumbar division of the involuntary nervous system. Not all persons with sympathomimetic symptoms have an increased basal metabolic

¹ Read at a conference of medical officers held at the United States Naval Hospital, San Diego, Calif., Nov. 16, 1922.

rate. To the association of these symptoms with a normal basal metabolism, they have applied the term "autonomic imbalance." In these cases of autonomic imbalance, they were unable to discover the predisposing causes, but the exciting causes were the sex epochs in the female and foci of infection of the nasopharynx in both sexes. The commonest symptom was tachycardia, while thyroid enlargement was second in frequency. Some of these cases, however, presented all of the clinical signs and symptoms of exophthalmic goiter, except increased basal metabolic rate, thereby demonstrating that this procedure is an invaluable aid in diagnosis.

According to Osler, hyperthyroidism and exophthalmic goiter are one and the same disease, but later investigators have found that there are at least two distinct types, namely exophthalmic goiter and toxic adenoma, and it would seem that such a classification is more in keeping with the symptomatology and pathology as exhibited in these conditions and that the term "hyperthyroidism," if used at all, should be representative of the symptomatology of the two groups and used interchangeably with the term "thyrotoxicosis." In view of the fact that there are two definite disease entities characterized by marked similarity of symptoms, it is believed that a division into the two groups as mentioned above is essential for the proper conception of the disease considered as a whole.

Group 1 includes goiters of the toxic type, other than true exophthalmic goiter. As a rule this type is of long standing and symptoms of a rather mild character have existed for a considerable period of time and the patient only appears for treatment when an acute exacerbation occurs. Pathologically, these may be simple, colloid, cystic, adenomatous, and possibly malignant.

Group 2 are the true exophthalmic types, familiarly known as Graves, Basedow's, or Parry's disease. In this type the parenchyma of the thyroid gland is hyperplastic, it may or may not be perceptibly enlarged, but the clinical course is definite and progressive though there may be remissions and exacerbation. In both types of hyperthyroidism, the etiological factors are rather indefinite, though it is quite evident that sex and age exert considerable influence, as the proportion of females afflicted is greatly in excess of males. It is also true that the vast majority of cases in both sexes develop in comparatively early adolescence. Frequently there is an apparent strong family predisposition, as many as five or six members being affected. Various depressive influences, such as worry, illnesses, mental shocks, and dread of the disease itself, may have an important influence.

In considering the two conditions from the symptomatic standpoint, we find that in thyrotoxicosis of the exophthalmic type the onset is acute as a rule, the thyroid gland is usually enlarged, though

this does not occur in all cases. The gland is symmetric and the symptoms develop with the enlargement. A thrill and bruit are present in the majority of cases and, if the latter is absent, the correctness of the diagnosis is questionable. There is a fine intensive tremor and in all cases an associated persistent tachycardia under all conditions, and, of course, exophthalmos in a great many cases. There is no tendency toward hypertension, the diastolic pressure is low, the pulse pressure high, gastrointestinal crises frequent, and the basal metabolic rate is invariably high.

The other type of thyrotoxicosis to be differentiated from Graves's disease is an adenomatous condition of the thyroid gland, associated with hyperthyroidism. In this the onset is insidious and often extends over a period of several years. There is a history of thyroid enlargement of long duration, and quite frequently one obtains a recital of repeated attacks of hyperthyroidism. A thrill and bruit are almost always absent, the tremor is not so pronounced and is more irregular in character, exophthalmos rarely occurs, but there is a decided tendency toward hypertension. The basal metabolic rate is not so high as in the exophthalmic type. In these conditions of secondary hyperthyroidism the patient frequently seeks the physician for relief from grave cardiac manifestations, and these so overshadow the primary disease that the proper interpretation of the manifestations of the original hyperthyroidism is rendered most difficult. Occasionally cases of exophthalmic goiter resemble very closely incipient pulmonary tuberculosis, and Charles A. Elliott, of Northwestern University Medical School, states that the basal metabolic rate has proven of great assistance in ruling out this condition. In hyperthyroidism the rate is universally high, while in pulmonary tuberculosis it is practically within the normal limits.

So far, we have considered what might be termed the well-defined cases of thyrotoxicosis, but it behooves us to remember and realize that we have here, as in all other pathological conditions, certain borderline cases which are most difficult to diagnose and which require the most careful and intensive study to arrive at a definite conclusion. There is no difficulty experienced where tachycardia, goiter, and exophthalmos—the pathognomonic triad—are present, but there is no doubt that a severe test is placed upon our diagnostic acumen when we attempt to determine what is the minimal clinical symptomatology needed to make a diagnosis in such cases.

It is generally conceded that symptoms must be continuous and that transitory tachycardia and tremor when combined with increased nervousness should not be interpreted as hyperthyroidism. There are cases, however, which under certain conditions, such as excitement or moderate exertion, present peculiar manifestations, espe-

cially tachycardia and tremor, which are quite similar to those observed in hyperthyroidism. The question then naturally arises, Shall we consign cases of this type to that great scrap heap of undetermined diagnoses termed "neurasthenia," or shall they be considered as possible thyrotoxicoses?

Cannon has advanced the opinion that there may be continuously present in the blood an increased thyroid secretion, below, however, the amount to excite definite clinical symptoms. Upon exertion or excitement this secretion is increased to the point where the symptoms begin to appear. Working upon this assumption, Joseph L. Miller and B. O. Raulston, of Chicago, collected 26 cases in which there were symptoms of tachycardia, tremor, and increased nervousness, but—and here is the point which they emphasize—none of these symptoms were constant. In studying these cases they considered everyone in which nervousness was the chief complaint a case of potential hyperthyroidism. According to them, the history furnishes an invaluable guide, as recognizable clinical symptoms may be absent at the time of examination, but careful questioning will invariably elicit a history of transitory tachycardia upon moderate exertion, nervousness without cause and beyond the patients' control, and tremor upon excitement or overexertion. Of their cases 65.4 per cent gave a metabolic rate ranging from plus 30 to plus 94, 3 had a rate between plus 15 and plus 20, 3 between plus 10 and plus 15, and 1 plus 7. The average rate of the 23 cases definitely above normal was plus 35.7. In arriving at the conclusion that these were cases of mild hyperthyroidism they took into consideration the fact that they were dealing with a condition in which there was increased glandular activity and in which it was but natural to suppose there would be varying degrees of intoxication. Furthermore, the increased metabolic rate was present in a very large percentage. The therapeutic test also indicated the correctness of the diagnosis, as 75 per cent that underwent a well-recognized method of treatment considered themselves cured and 66 per cent returned to a normal basal metabolic rate.

Before taking up the subject of treatment of hyperthyroidism, it might be well to mention certain laboratory aids to diagnosis, which have been recently advanced. According to Goetsch, in states of thyrotoxicosis there is hypersensitiveness to epinephrin. In a positive reaction a subcutaneous dose is characterized by an early rise in blood pressure and pulse rate, accompanied by an exaggeration of nervous symptoms. The value of this test, however, is questionable, as the same reaction may be obtained in other conditions or even in normal individuals. Tests of sugar tolerance, nitrogen loss, and acidosis have been made by Leuders in cases of hyperthyroidism, but these likewise have failed to prove of much significance. The one test which is being accepted as of great value is the estimation of the

basal metabolic rate, and experience seems to justify its adoption, as practically 98 per cent of all cases present an increase in basal metabolism.

In regard to treatment of hyperthyroidism, our therapeutic armamentarium is quite limited, and we find that there is considerable difference of opinion as to what procedure is the most efficacious. It is agreed, however, that if we are to get satisfactory results early diagnosis is absolutely essential, whether therapeutics be along medical or surgical lines. In dealing with a condition which is the result of overactivity of one of the glands of the body, it would certainly seem rational to reduce the amount of glandular structure thereby curtailing its hyperactivity. This is best brought about by the application of the Roentgen ray and by surgical interference. The outline of treatment as carried out at this hospital consists of (1) rest in bed for a period of from 7 to 10 days, or longer, if the cardiac or nervous symptoms are very marked; (2) a fat free diet with meat restriction; (3) removal of all foci of infection; (4) administration of suprarenal cortex three times a day and (5) the application of the Roentgen ray. A weekly record is also kept of the weight, blood pressure, and basal metabolic rate.

CHRONIC APPENDICITIS.¹

By C. L. ANDRUS, Lieutenant, Medical Corps, United States Navy.

The subject which I am to present this evening is one which is worthy of careful study, active interest, and serious consideration—*chronic appendicitis*. It has to do with a condition now recognized as being capable of manifesting itself by such a diversity of symptoms and disease pictures that to arrive at a correct diagnosis demands, at times, careful, painstaking, and far-reaching study of the patient, followed by the exclusion of various possibilities. The problem is therefore a difficult one.

There are really only two varieties of appendicitis, acute and chronic. A third might be considered, i. e., an acute exacerbation of a chronically affected appendix. With this general anatomical and clinical classification we can make a further classification of varieties which are met with, as follows:

Acute appendicitis.

1. Catarrhal.
2. Interstitial.
3. Ulcerative.
 - (a) Nonperforated.
 - (b) Perforated.

¹ Paper read before the conference of medical officers, United States Naval Hospital, San Diego, Calif., Nov. 2, 1922.

Acute appendicitis—Continued.**4. Purulent.****5. Gangrenous.****Chronic appendicitis.****1. Catarrhal.****2. Interstitial.****3. Obliterating.**

This anatomical classification indicates the pathology of the lesions which may be found in diseased appendixes. It is in a measure in keeping with the clinical course of some cases. It must be remembered, however, that the type may vary during the clinical course of the disease in any given case and that it is impossible to determine exactly just what the pathology of the appendix is prior to operation.

What clinically has been an acute appendicitis, may at operation, with the assistance of the pathologist, prove to be an acute exacerbation of a chronically inflamed appendix. The discrepancy between the clinical and the pathological diagnosis may be accounted for by a more careful review of the case or may remain, either because the patient has forgotten or the physician has not sufficiently developed the past history of the patient. On the other hand, previous attacks may have been so mild and insidious in character as to have passed unnoticed by both patient and physician. Undoubtedly the latter is often the case, as is recognized by Aschoff and others.

I will not describe in detail the pathology of each of the types as classified. However, in order to visualize clearly the subject under discussion, it will be well to keep in mind the underlying pathologic condition, especially of the chronic forms.

The mucous membrane of the appendix is studded with depressions called the crypts of Lieberkühn, which are not unlike the crypts of tonsillar tissue, and these crypts in becoming the seat of an inflammatory process constitute what is termed a simple catarrhal appendicitis. When the process becomes chronic we have the chronic-catarrhal type which usually runs a mild course with possibly now and then minor acute exacerbations. Macroscopical examination of such an appendix shows it to be a little thicker, stiffer, and more firm than normal. On incising it the mucosa is found to be grayish in color, somewhat thickened with the crypts moderately distended and its surface covered with a layer of rather thick mucous. The size of the lumen may vary at different points as a result of previous inflammatory attacks.

If the catarrhal process extends to the submucosa and other layers of the organ, we have the diffuse or interstitial type, which may go on to the ulcerative, purulent, or gangrenous conditions. The simple catarrhal or diffuse types may occur without any definite symptoms,

and where the power of tissue repair has been maintained, scar tissue may be the only evidence of a disease process having at one time been present.

It is probable that a chronic catarrhal appendicitis does not persist without the extension of pathological changes to all of the coats of the organ. This chronic interstitial type represents the majority of properly operated cases with the diagnosis of chronic appendicitis. The macroscopical appearances of this type vary considerably, depending upon the varying degrees of inflammation of the different coats. Such an appendix is thicker, stiffer, and firmer than normal and is noncollapsible. On incision the appearance is much like that of the chronic catarrhal type. With scar tissue as the end result of the inflammatory processes, cicatricial contraction takes place, giving rise to stenosis or complete obliteration of the lumen at different points, angulation, flexure, and twisting. Obliteration of the lumen is probably due to annular ulceration of the mucosa with subsequent union of granulating surfaces by means of newly formed connective tissue. Following obliteration of the lumen, the so-called cystic dilatation, retention, cyst, and hydrops of the appendix develop. A chronically inflamed appendix may be in a hyperplastic or atrophic state.

The purulent form may exist without the picture of appendicitis developing if the lumen of the appendix remains patent and drainage is adequate. Even when the pathological process results in tissue death, ulcer formation, and perforation, or when drainage is not sufficient, the power of repair may be so well maintained that surgical intervention may not be necessary for recovery from acute danger.

After repeated attacks of acute appendicitis the appendix acquires a chronicity due to the interstitial scar tissue, surrounding adhesions, retained fecaliths, or obliteration of the lumen. The chronic appendix is subject to acute exacerbations which may present the picture of an acute appendicitis without the history of previous attacks. In an analysis of 5,647 appendices, Koltz gives the following as the relative frequency of these conditions: 1,718 showed chronic interstitial lesions, 1,689 had adhesions, 832 were obliterated, and 195 contained concretions.

If an acute attack with localized peritonitis goes on to recovery without operation, the appendix may be left attached or adherent to certain surrounding organs. A considerable portion of the appendix or only the tip may be attached to the right tube and ovary, or even to the left, also the bladder, the cæcum, ileum, duodenum, the gall-bladder, or stomach.

Under the heading of chronic appendicitis might be mentioned tuberculosis of the appendix, actinomycosis of the appendix, typhoid

appendicitis, and tumors of the appendix, both benign and malignant, primary and secondary. A discussion, however, of these specific irregularities is not within the scope of this paper.

The etiology of appendicitis leads one to a study of focal infections, gastroenterology, and other interesting subjects, but is approximately a part of the discussion of acute appendicitis. The chronic appendix is a chronic appendix by virtue of practically the same process in all cases, whether the etiologic factor was largely predisposing, contributory, essential, or infectious, directly or indirectly. It can be said then that the etiology of chronic appendicitis is acute appendicitis.

The symptoms of chronic appendicitis can be divided into two groups: firstly, those of the abdomen which are connected more directly with the digestive system, and, secondly, those outside of the digestive system which are referred to organs located elsewhere. Of the symptoms within the abdomen the most constant is soreness and pain in the region of the appendix, which is aggravated by exercise. This is more or less characteristic of relapsing or recurrent appendicitis. The soreness can usually be elicited by making deep pressure over the appendix and during periods of more or less acute exacerbations may occasion considerable anxiety. The pain may radiate down the right thigh. On the other hand the chronically affected organ may give rise to a form of appendicitis with referred symptoms, there being practically no symptomatology localized about the appendix. This is the form that is most difficult to diagnose, as the picture may simulate that of gastric or duodenal ulcer, gall-bladder disease, or even renal calculus. The symptoms may be those of "chronic dyspepsia" and "gas" in the stomach, loss of appetite, coated tongue, constipation, nausea, and at times vomiting may be complained of. Again, the symptoms may be those of peptic ulcer with sour eructations, gnawing sensations in the epigastrium and "hunger pains" which are relieved by taking food. There may be diarrhea with mucus in the stools. Dieulafoy has described a so-called toxic appendicitis in which hematemesis occurs. Sir Berkeley Moynihan has said: "There is no longer any doubt in my own mind that the commonest site of a gastric ulcer is in the right iliac fossa. That is to say, in the majority of cases, where the symptoms would justify or compel a diagnosis of ulcer, the patient is suffering from a lesion elsewhere and, more often than not, from a lesion in the appendix."

Of the symptoms outside of the abdomen much could be said, but little can be said with any degree of certainty. In addition to one or more of the above symptoms the patient may complain of weakness, headache, backache, nervousness, loss of weight, or hypochondriasis.

The symptoms may be referred to the urinary tract or cardiovascular system.

The diagnosis of chronic appendicitis may be easy or difficult depending upon whether or not a history of previous acute attacks can be obtained. Without such a history physical and laboratory findings may often be misleading. The diagnosis is best arrived at by exclusion. It is only in this way that it may be possible to rule out such diseases as chronic gastric ulcer, duodenal ulcer, chronic colitis, chronic pelvic diseases, cholecystitis, cholelithiasis, calculus in the kidney or ureter, various visceroptoses, sacro-iliac strain, certain so-called endocrine disturbances, gastric crises of tabes dorsalis, and neuroses.

In order to make exclusion possible in some of the more obscure cases of chronic appendicitis it is necessary to augment a thorough physical examination by an analysis of stomach contents, stool examination, blood examination, including the Wassermann, urine analysis, and kidney efficiency tests, together with fluoroscopic, X-ray examinations, and basal metabolism estimations. These tests may be of as much indirect value as of direct importance by throwing light on the presence of disease conditions other than appendicitis.

In the physical examination of the abdomen perhaps the most significant finding is persistent tenderness over McBurney's point, but even this is sometimes lacking. It may be more definite at one time than at another, but can usually be elicited, especially if the examination is properly made. With the patient lying flat on his back, his arms elevated and his knees partly flexed, make pressure with the index finger over McBurney's point and have the patient extend the right leg. Holding the extended leg rigid it is elevated and in so doing the diseased appendix is pinched between the anterior abdominal wall and the belly of the ileopsoas muscle, giving rise to marked tenderness. This is the so-called Meltzer's sign. Inflating the bowel with air (Bastedo's sign) and applying pressure downward over the cæcum toward Poupart's ligament (Rovsing's sign), pain and tenderness may be produced in the region of the appendix. A positive Meltzer's sign can be obtained in about 70 per cent of cases of chronic appendicitis. Rigidity of the right rectus is present in only a small percentage of cases.

In certain obscure cases catheterization and Roentgen ray examination of the right kidney and ureter may be in order. There is a case in the hospital at the present time which offers interesting possibilities in this connection. The patient was admitted with the diagnosis undetermined. He complained of pain in the region of the right lower abdomen, radiating to the right back and testicles.

The pain was dull in character, not severe enough to necessitate his stopping work. Appetite good, constipated, and no urinary symptoms. A diagnosis of chronic appendicitis was made. At operation a chronically inflamed appendix about 5 inches long and bound down by old adhesions was removed. The patient was making an apparently uneventful convalescence when on the nineteenth post-operative day he was suddenly taken with an attack of severe pain in the region of the right kidney, nausea, vomiting, and blood in the urine. Further study has shown the presence of large renal calculi in the right kidney. If a Roentgen-ray study of the gastrointestinal tract and abdomen had been made in this case in developing the diagnosis of chronic appendicitis, it is most likely that evidence of both conditions would have been found, and the question would have been raised as to which of the two conditions was responsible for his symptoms. It is possible that each condition has been responsible for its share of symptoms.

A rectal examination in the male and a pelvic examination in the married female may assist in giving information. A routine examination of teeth, tonsils, sinuses, and eyes should be carried out. Watson Williams, in a series of 90 cases with nasal accessory sinus infection, found that 15.5 per cent had undergone appendectomy. Gastric analysis, especially in the absence of an ulcer of the stomach, may give valuable information, since it may indicate trouble in the abdomen beyond the stomach, the most common location being in the right lower quadrant. In 263 cases of chronic appendicitis with operation reported by Lichty, in which gastric analyses were made, 189, or 71.9 per cent, had hyperchlorhydria; 47, or 17.8 per cent, had hypoacidity; and 27, or 10.3 per cent, had achylia. Those with achylia were for the most part cases giving a history of great chronicity and were much below normal in health. At operation they revealed extensive pathologic changes with adhesions about the appendix and caecum. The effect on gastric function of extragastric pathological conditions, especially in the abdominal cavity, have been noted during the last 10 or 15 years by a number of close observers.

A thorough stool examination should be made for parasites, mucous, and blood. The presence of mucous and blood must be carefully interpreted. While serving on the Asiatic Station I had the opportunity of seeing a number of cases of ascaris infection which clinically closely simulated appendicitis and which after an appropriate course of treatment with santonin entirely cleared up.

Considerable valuable information is often obtained from a Roentgen-ray examination of the gastrointestinal tract, since in chronically affected appendices, one is often able to demonstrate localized tender-

ness, fixation, position, angulation, constriction, abnormal retention, incompetency of the ileocecal valve, and even visualization of the appendix.

If after the foregoing diagnostic procedures have been carried out the diagnosis is still in doubt, it may be necessary to institute a course of hygienic, dietetic, and symptomatic treatment for a period of possibly a month before a diagnosis can be made. With cooperation on the part of the patient a satisfactory diagnosis may be arrived at, either of chronic appendicitis or some other true condition from which the patient is suffering. Whenever gastric disturbances are not ameliorated by active rational treatment of sufficient duration, among other etiological factors of gastric disturbance some form of appendicitis should be considered.

We have recently had two cases in the hospital who were admitted with the diagnosis of hernia. Examination failed to reveal the presence of this condition, and after a period of observation in each case, together with obtaining a careful history, the diagnosis of chronic appendicitis was made. Both came to operation. One patient has been returned to duty, with no further symptoms and in good condition. The other is still in the hospital. At operation in this case a chronically inflamed organ was removed which, together with the cæcum, was bound down by dense old adhesions.

Liek, of Danzig, has pointed out the frequency with which a certain group of patients showing evidence of a distinct neurosis present the symptoms of chronic appendicitis. These he terms "pseudo appendicitis." He analyzed 1,000 cases which had been operated upon and found that 100, or 10 per cent, were bona fide cases of chronic appendicitis. It is quite probable that many patients so successfully treated by the late Dr. S. Wier Mitchell with his system of "rest cure" were cases which we now are too ready to call chronic appendicitis and are attempting to cure by operation.

The question of differential diagnosis can well be illustrated by an abstract of a case from the clinic of Dr. Charles Gordon Heyd at the New York Post-Graduate Hospital. The patient, a woman of 30 years of age, married, complained of attacks of "sick stomach," nausea, and vomiting, over a period of two years. She had six attacks in all, each succeeding attack being more severe than the previous one. Between attacks the patient felt comparatively well. With each seizure she was taken with cramplike pains in the epigastrium, and nausea. The attacks, which lasted from 3 to 10 hours, were ushered in by a feeling of nausea, followed by the regurgitation of "sour water" into the mouth. Within an hour knifelike pains occurred, beginning in the epigastrium and spreading to the right side and radiating to the back. At times a doctor was called

in order to obtain relief. Attacks occurred at different times during the day and night. The patient was able to eat, but did not have any great desire for food during the attack. Food eaten bore no relationship to the character, intensity, or localization of the pain. There was never any jaundice or blood observed in the stool, and soda bicarbonate was never taken for the relief of symptoms. Physical examination was negative except for some general abdominal sensibility. Temperature, pulse, and respiration were normal. The Wassermann was negative. Pupils and reflexes were normal. Radiographic examination of the gastrointestinal tract showed a medium-sized stomach of the orthotonic type, the pylorus spastic in type and at the level of the third lumbar vertebra. No true intrinsic defect was noted. Peristalsis was visualized over both curvatures and emptying was rapid. The motor meal showed fairly normal distribution in the ilium and cæcum. The cæcum was freely movable and no tenderness was noted. The appendix was not visualized. Diagnosis: Chronic appendicitis.

We have here a patient 30 years of age who had six attacks of pain in the epigastric region in two years. The pain was preceded by nausea and the regurgitation of some material. The attacks came on without warning and were of maximum severity after they began and had a duration of from 3 to 10 hours. There was no evidence of any disturbance between attacks. The assumption is, then, that the attacks were ushered in by a neuromuscular mechanism disturbing the normal motor and secretory functions of the stomach. The localization and character of the pain causes one to assume that the mechanical factor is that of hyperperistalsis or spasm. One must consider that the irritation in this case was intraabdominal, since 40 per cent of indigestions are due to causes extrinsic to the stomach but within the abdomen and 40 per cent are due to causes remote from the abdomen. The latter in this case can be eliminated and it can be assumed that the trouble is within the abdomen.

It is necessary then to differentiate between intrinsic affections of the stomach, duodenum, gall bladder, appendix, intestines, and pelvis. The history of gastroduodenal ulceration is not that of this patient. In ulceration of the duodenum and stomach the symptoms produced are present over a longer period of time and the intervals of relief are reckoned in hours, not months.

It can not be a case of cholecystitis or cholelithiasis, for in these conditions there is more or less continuous gastric distress with only occasional interruptions. Affections of the intestines are eliminated by the X-ray findings. Bimanual examinations of the pelvis revealed nothing to suggest reflex disturbances from the uterus or

adnexa. Kidney or ureteral stone were also eliminated by the X-ray examination.

The symptomatology of a chronically diseased appendix is marked, if at all, by the extreme variability of the dyspepsia and lack of regularity in the evolution of symptoms. The mechanism producing the symptoms in most cases is probably that of pylorospasm with pain, increased secretion, increased acidity, gaseous and sour eructations, and occasional vomiting.

An interesting point in this case is that the attacks became more severe, each succeeding attack being more intense than the preceding ones and with a tendency toward shortening the interval between attacks. This is explained by the relatively increasing stenosis of the appendical lumen. With each attack there was a slight increase in the degree of infection of the appendix, and with the tumefaction, edema, and temporary occlusion of the appendix there was produced retention of infected feculent matter. In the spasm of the walls of the appendix in its effort to rid itself of the retained contents a pronounced irritation was produced in the entire small intestine, the ileocecal valve, and pylorus. The hyperactivity of the small intestine demonstrates the physiological law that whenever in the gut there exists a point of irritation there is an increase in the normal functions of the gut segment above the point of irritation, and we have hypermotility and hyperperistalsis of the small intestine. The reflex pylorospasm may account for the increase in secretion and disturbed motor function of the stomach.

This case came to operation, and as far as observed her health has been better than at any time during the preceding 10 years.

The only treatment for chronic appendicitis which offers any degree of hope for a cure is operation. This, however, in a considerable number of cases is disappointing, since only about 60 per cent of cures can be claimed. The 40 per cent of failures are to be accounted for in a number of ways. Many patients actually suffering from a chronically diseased appendix have by the time they come to operation reached a stage of chronic invalidism, which is a condition not usually cleared up by simply removing a pathological appendix. They require additional care, dietetic, hygienic, mental, and social. A full appreciation of this fact by both doctor and patient would increase the number of ultimate cures. Attention to this phase of the treatment may be as much indicated before as after the operation.

Another important reason for failure is "snapshot" diagnosis. If the patient gives a satisfactory history of previous attacks of pain in the lower right abdomen, it is very easy to jump at the conclusion that the appendix is entirely responsible for the ill health

of the sufferer without going thoroughly enough into the case to exclude the presence of other possibilities. It is true that in this type of case our efforts are often crowned by success, but the results are more luck than science. In these, as well as in more obscure cases, when failure to relieve the patient of his symptoms is the end result of appendectomy it may mean nothing more or less than failure to recognize marked nervous symptoms, or some pathological condition in other organs, such as the stomach, gall bladder, right kidney, ureter, pancreas, or pelvic organs. Doctor Cecil, of Los Angeles, in a review of 300 cases of diseases of the kidney and ureter has shown that the classical picture of pain beginning in the region of the superior lumbar triangle and radiating to the genitalia or thigh is not always present, and that in some cases it is purely abdominal in type. In these atypical cases, due to its localization, it may be confused with the pain of appendicitis, gall-bladder disease, or gastric disturbances. Twenty-eight per cent of his cases of stone in the kidney or ureter presented abdominal pain without pain in the back, and in six cases it was limited to the right lower abdomen. Zweig has reported 13 typical cases of appendicitis, confirmed by operation, in which duodenal ulcer, cholecystitis, and appendicitis make up an abdominal triad.

Still another reason for failure lies in the small abdominal incision which means appendectomy, not exploratory laparotomy. Especially in the more difficult cases should the operation be an exploratory laparotomy and not simply an appendectomy, the appendix being removed on the way out.

Recovery from operation should not be considered synonymous with cure, and a guarded prognosis as to the ultimate outcome should always be given as the removal of a chronically inflamed appendix, especially where the symptoms have been vague in character, does not carry with it a guarantee of health.

CONCLUSIONS.

- (1) It is not always easy to establish the diagnosis of chronic appendicitis.
- (2) A definite history of chronic appendicitis does not exclude the possibility of another lesion.
- (3) Surgery offers the best hope for cure, but 100 per cent results can not be expected.
- (4) Dietetic and hygienic treatment are needed in some cases in addition to appendectomy.
- (5) Cases of chronic appendicitis giving a satisfactory history of previous attacks offer the best hope of cure by appendectomy.
- (6) Exploratory laparotomy should be done in all cases coming to operation for chronic appendicitis.

YAWS, A STUDY BASED ON OVER 2,000 CASES TREATED IN AMERICAN SAMOA.

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Yaws is an endemic, specific, highly communicable tropical disease, caused by *Spironema pertenue* (Castellani 1905), with a primary extra-genital lesion, with or without constitutional disturbances, and characterized primarily by an eruption of papules which usually develop into more or less exuding cauliflowerlike nodules or patches. In the Samoan language the disease is called tona, lupani, or nupani.

Several writers have suggested that the term "saraat" in the thirteenth chapter of Leviticus means yaws instead of leprosy, as usually translated. The disease "safat," described by the Arabian physicians of the tenth century, is considered by some authorities as being yaws. The disease described by Oviedo y Valdez as existing in the West Indies during the sixteenth century was undoubtedly yaws. In the seventeenth century Rochefort, Breton, and Labat reported it in the West Indies. Piso refers to it in Brazil in the seventeenth century. Outbreaks of yaws frequently occurred on the ships carrying African slaves to America. In 1718 Bontius described it as existing in the East Indies. The outbreaks of "sibbens" in Scotland (1769), of button scurvy in Ireland (eighteenth century), of "radesyge" in Norway and Sweden (1710), and the "mal de chicot" of Canada are thought to have been yaws. Recently a disease not unlike yaws has been reported from Greece. Sydenham considered West Africa to be the endemic home. Many others believe the endemic home to be America and that it spread throughout the Tropics from America.

Bennett stated that yaws was endemic in the Samoan Islands in 1832. Koeniger believes that its introduction into the Samoan Islands was comparatively recent. From the writings of the London Missionary Society, a disease that was undoubtedly yaws was endemic in the South Sea Islands in 1796. According to Samoan genealogy the first traditional case of yaws (tona) was in Puleleite, the son of Togia, of the village of Sagone. This was 16 generations ago in a direct line to a chief now living of about 40 years of age (440 years ago, or about 1482). Supa, a Samoan disease, may be either tertiary yaws or leprosy. The first mention of supa is associated with the name of "Tigilau" and an incident that occurred 28 generations ago. Tigilau is a well-known name in Samoan traditions. According to Samoan history, handed down from generation to generation, gangosa was evidently very prevalent at one time and has only been on the decline during the past few generations. Turner stated that in 1830 two out of every three Samoan babies died from

malnutrition or secondary infection following yaws. In 1900 it was estimated that the infant mortality in American Samoa was at least 50 per cent.

The Samoans believed until very recently that all children should have yaws before they reached the age of 10 or 12 years; if it did not develop until after the age of 12 the disease would be more severe and last over a much longer period. We have heard of mothers deliberately infecting their children for fear that they would not have yaws. The Samoans believe that yaws and elephantiasis were very prevalent before the advent of the white man, which is quite contrary to their belief about conjunctivitis and tuberculosis. Fauntleroy, in 1907, stated that 85 per cent of all children in American Samoa had yaws. Ely, in 1913, started a campaign to eradicate yaws. During 1913 and 1914 over 2,500 injections of neoarsphenamine were administered. Certain laws were recommended by him as necessary if yaws was to be eradicated. Only certain of these recommendations were enacted into laws, and they not only proved inadequate but were not enforced. During the World War no further work on yaws was possible, owing to the inability to obtain salvarsan. Since 1919 the Bureau of Medicine and Surgery has furnished all the arsphenamine and neoarsphenamine that has been requested for the eradication of yaws. Dollard, in 1919, administered over 1,500 injections of arsphenamine, but with the exception of a few tertiary lesions of the feet only those with primary and secondary lesions were treated. In 1921, after a survey of the islands, it was estimated that there were, including all stages, 2,500 cases of yaws. A campaign was started immediately to eradicate the disease. Over 2,500 injections of neoarsphenamine were administered at the Samoan Hospital, outlying dispensaries, and by a party that visited all villages. During the first six months of this year (1922) this campaign has been continued and 750 injections of neoarsphenamine have been administered. At the present time (September, 1922) a party is making another village-to-village campaign. Necessary quarantine laws have been enacted, which will be discussed under prophylaxis and treatment.

Regarding epidemiology, Paulet in 1848 inoculated 14 negroes with material from yaws lesions, and all of them developed yaws after a period of incubation of from 12 to 14 days.

Charlouis in 1881 inoculated 32 Chinese prisoners with scrapings from a yaws lesion. The disease developed in 28 of them, first showing itself at the site of inoculation.

Charlouis in 1881 inoculated a native suffering from yaws with syphilis. A primary lesion developed and secondary manifestations of syphilis followed.

Castellani in 1905 discovered the causative organism. "The casual agent, *Spironema pertenu*, is an extremely delicate spiral-shaped organism, often actively motile, measuring from 4 to 30 microns in length, the average being some 18 to 20 microns, and possessing 6 to 20 uniform small, rather rigid, undulations, the width being extremely minute."

Artificial cultivation of the *Spironema pertenu* has been performed by Noguchi.

We have been unable to cause infection through intact skin with the scrapings from a yaws lesion. *S. pertenu* have been found in the ulcerated and nonulcerated lesions of the secondary stage. We have been unable to find the *S. pertenu* in the scrapings from tertiary lesions.

We have seen five cases that were caused by the "contact" method of infection. The passage of the disease in these cases was from the suckling to the mother's breast. These mothers all gave a history of yaws during childhood.

The principal cause of transmission of yaws in Samoa is the fly. We base this statement on the following facts:

1. The principal breeding place of the fly in Samoa is in the rotten breadfruit that drops to the ground during the breadfruit seasons, November or December, April, and August.
2. Swarms of flies appear during the breadfruit seasons. While flies are plentiful at other times, yet they are negligible as compared with the number during the breadfruit seasons.
3. Yaws, while endemic in Samoa at all times, becomes almost epidemic during or shortly after the breadfruit seasons.
4. Abrasions or sores on native children are always covered with flies. Samoans make no effort to protect abrasions or small sores from the flies.
5. The occurrence of yaws in white children, who, though living in close proximity of a Samoan village, yet did not come in contact with any natives.

We believe that no permanent immunity is gained by childhood attacks. We have on record many cases of reinfection in the untreated and among those presumably cured.

The symptomatology of the disease is rather complex.

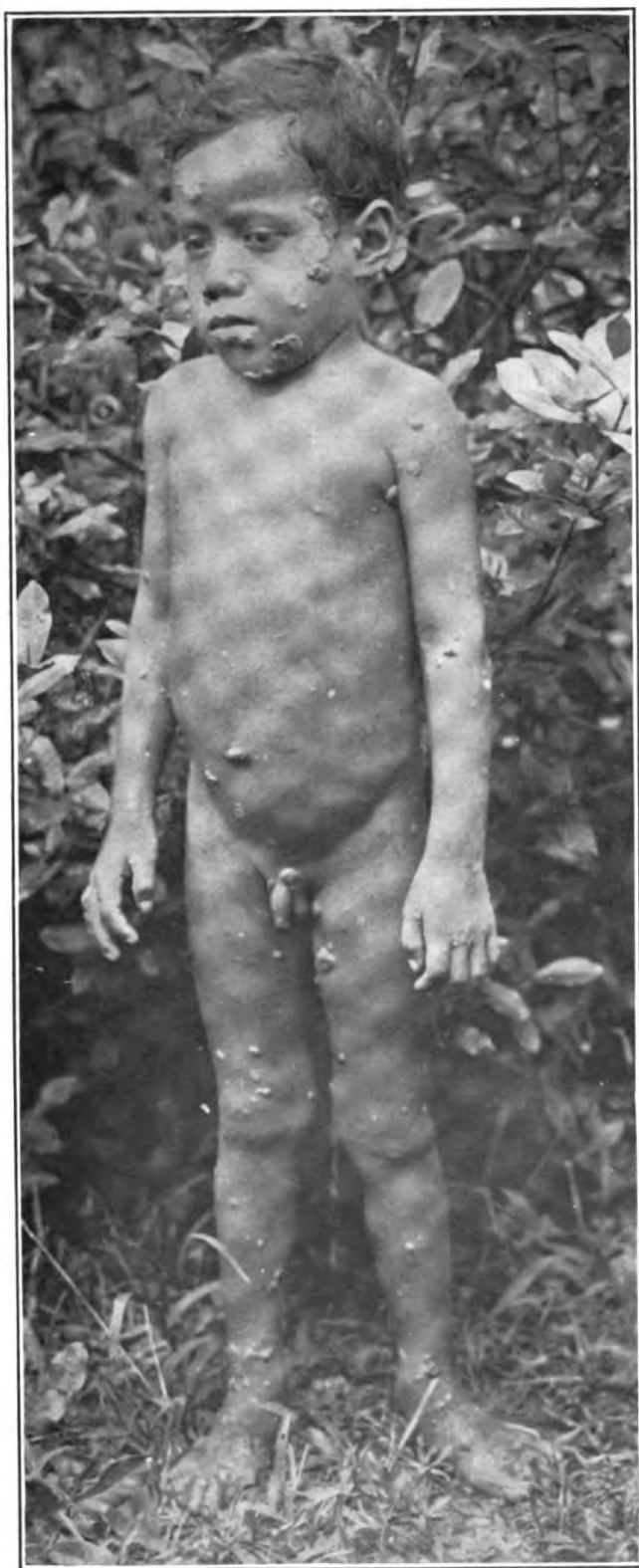
The incubation period varies from two to four weeks. Authorities say that it is characterized by malaise, rheumatoid pains, headache, and irregular rises of temperature. Stelwagon includes hyperidrosis, anorexia, vertigo, and palor of skin. In our experience prodromal symptoms are rare and when found could readily have been due to other existing conditions, such as constipation, worms, bronchitis, etc.

The primary stage generally begins as a hard extragenital papule, which gradually enlarges, is ultimately absorbed by ulceration, and becomes crusted over. Ulceration and granulation progress under the characteristic yellow crust. This stage may begin as a pustule, with ultimate ulceration and granulation. We have repeatedly observed kerionlike formations on infants as the only evidence of the primary lesion. It has been stated by some that it begins as furfuraceous whitish patches which cause itching on the trunk and limbs. These patches coalesce and cover great areas and then leave the skin lusterless and rough. The similar conditions which we observed had no direct relationship to yaws.

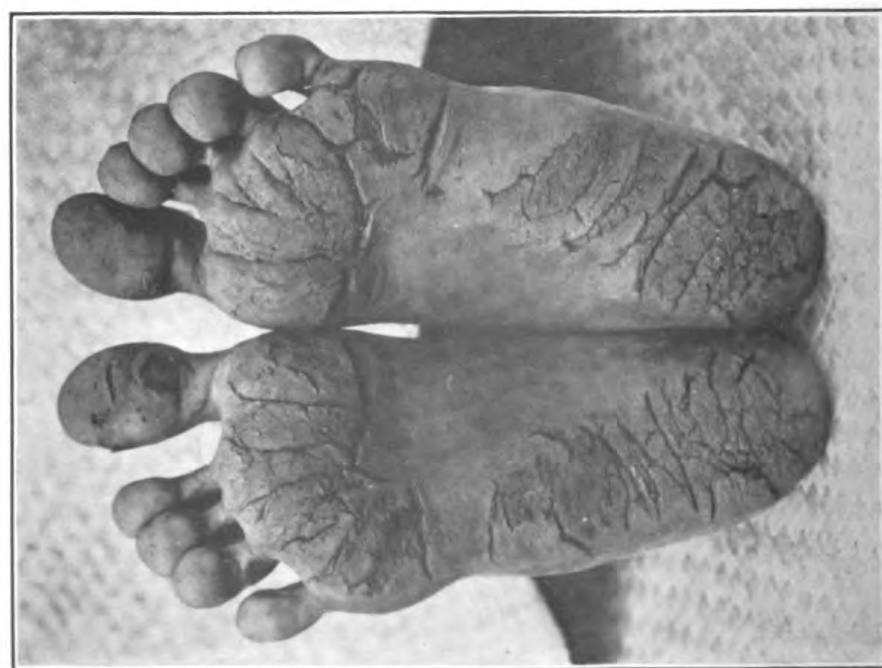
No marked symptoms are produced except at the site of the papule, where there may be some pain according to the location and the degree of tension. Usually there is an itching sensation which varies in intensity. Glandular involvement is observed even in the absence of secondary infection. Secondary infection is quite common.

This primary lesion may heal quickly and leave a whitish scar which subsequently becomes pigmented. It may develop into a granuloma resembling those of the secondary eruption, may develop into a large ulcer and remain throughout the secondary stage, or it may become larger than any of the secondary lesions. This last is referred to as the "mother yaw," and in Samoa is often called the "king tona."

The secondary stage, characterized by a general eruption, begins usually between one and three months after the appearance of the primary lesion, is of indefinite duration and of variable severity. Here again we found prodromal symptoms the exception. The general eruption begins as minute roundish papules, the size of a pin-head, on various parts of the body. At first they are in quite widely separated locations, but as they increase in number they appear in crops. Some papules soon show a yellow point or minute yellow crust at their apex. Most of them remain the same size for many weeks and then disappear. Others may become larger, several often coalescing and frequently acquiring a dark areola. Some of the larger papules develop into the characteristic granulomatous nodules covered with a crust of desiccated secretion. These frequently become umbilicated or present a most striking resemblance in shape to the cauliflower. It is not uncommon to see the umbilicated and cauliflowerlike formations develop even in smaller papules. (See illustration.) They may be found on any part of the body, but most frequently occur about the face, buttocks, genitalia, and trunk. They may remain about the same size and appearance for months. Often after a few weeks the secretion diminishes and they become much harder in consistency. In most cases the granulomata dry up and disappear within three months to a year and leave a per-



THE SECONDARY STAGE OF YAWS.



FISSURED FEET, CHARACTERISTIC OF TERTIARY YAWS.



TERTIARY YAWS, LYMPHATIC INVOLVEMENT. CORNEA OF EACH EYE OPAQUE

602-2

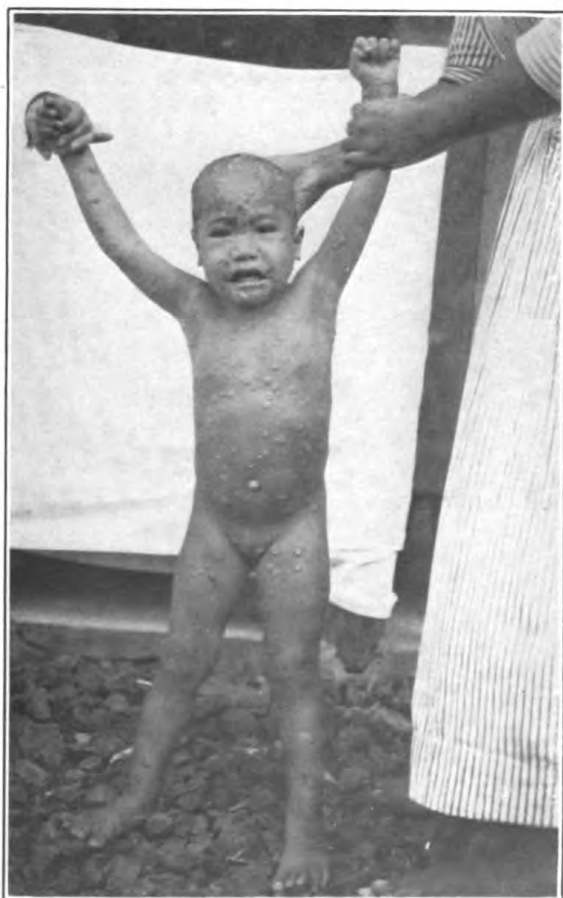


SECONDARY YAWS SHOWING UMBILICATED LESIONS.



LATE SECONDARY YAWS, NEGLECTED CASE. NOTE PIGMENTED SPOTS ON ABDOMEN, THE SITE OF HEALED LESIONS.

602-3



SECONDARY YAWS. GENERALIZED ERUPTION
WITH VARIOUS TYPES OF LESIONS.

602-4



TERTIARY YAWS WITH
SECONDARY LESION ON
HAND.

sistent spot which is either apigmented or highly pigmented and dark. The granulomata are seldom painful unless they develop on the hands, soles of the feet, or between the toes.

All types of lesions may be present at the same time. In fact, a large percentage of our clinic cases were of this class. They presented several typical frambœsiform granulomata, numerous small reddish papules with epidermis intact, other papules which had become moist and covered with a tiny yellow crust, deeply pigmented spots at the site of previous granulomata, and occasionally large irregular ulcers due to the breaking down of some granulomata. The ulcers do not heal spontaneously, neither do they yield to local treatment alone.

Castellani states that though the characteristic eruption of the secondary stage is the frambœtic granuloma, yet there are during this stage other types of eruption which he terms "frambœsides" and designates them as papular, scaly, and occasionally ulcerative. Our observation of the frambœsides is quite limited. The palms of the hands and soles of the feet are frequently affected by fissures, scales, pits, and hard fibrous nodules the size of a large pea or larger. We have been inclined to regard these as tertiary manifestations, especially since they always appear as the only unquestionable evidence of yaws infection without a history of recent general eruption. The immediate response to specific treatment strengthens our diagnosis.

In our series lesions of the mucous membranes occurred in less than one-half of 1 per cent of the cases. They most frequently appeared as granulomata of the nasal mucosa. Two cases had faucial patches which were suggestive of the "mucous patch" seen in syphilis. Granulomata of the vaginal mucosa and at the base of the tongue have been reported.

The involvement of the lymphatic system has been reported in a number of cases. Various groups of glands become involved, usually the inguinal and cervical. The glands are found to be enlarged, round or spindle-shaped, hard, painless, and never come to suppuration unless a secondary infection is present. In Samoa filariasis is endemic, consequently we can not positively state that the grandular involvements we observed were due to yaws.

We found the changes in the blood to be quite variable in the majority of the cases studied. The red count was a little below normal and the white count a little above normal. Large mononuclears are increased and the lymphocytes normal in number. Eosinophilia was quite rare even when the stool examinations were positive for intestinal parasites. (In Samoa hookworm infection

rarely causes an eosinophilia.) The complement fixation tests are the same as for syphilis.

The alimentary system may or may not be affected. In adults the symptoms are either very mild or not present at all. Those we observed could have been due to some other cause. In infants and children, however, a small percentage had very severe symptoms referable to the gastrointestinal or intestinal tract. There were no fatalities, but in two cases death seemed imminent. Administration of neoarsphenamine seems to aggravate the condition. Ridding the child of intestinal parasites does not lessen the dangers from neoarsphenamine given in the presence of acute gastrointestinal symptoms. In fact anthelmintic treatment seemed to increase the severity of the process. The treatment consisted of strict attention to diet and colonic irrigations were given as required. Specific treatment was given only upon the disappearance of all intestinal symptoms.

Involvement of the respiratory system is not common. Mention has already been made of lesions occurring in the nose and throat. It was interesting to note the number of children having an excessive secretion from the nose ("snuffles") during the secondary stage.

Painful joints are quite common. Any joint may be involved (most frequently the knee), and the number at one time may be one or many. The symptoms are localized pain, swelling, and fever. Some of the cases may be mistaken for acute rheumatic fever. Salicylates afford no relief, but potassium iodide readily reduces the temperature and alleviates all the symptoms.

Nearly 20 per cent of our cases showed involvement of the bones. Periostitis was the most common, and occurred on the digits, ribs, sternum, and long bones. While this condition is generally ascribed to the secondary stage, it is our belief that it is a tertiary manifestation. This belief is based on the fact that in all our cases of bone involvement the primary lesion appears years before.

Contractures of muscles, especially the flexors of the forearm, caused by either involvement of the muscles or nerves, have been recorded. We have observed contractures of muscles together with the scars of yaws lesions, but in most of our cases they were results of deep abscesses.

Disturbances of the nervous system are manifested by neuritis, motor and trophic disturbances, and hyperhidrosis. Our only case of the latter was a nurse at the Samoan Hospital. She had had a secondary eruption some six years before, and had received 0.6 gram of salvarsan intramuscularly, with the resultant rapid healing of all lesions. When placed under treatment she was suffering from hyperhidrosis and painful fissures in the soles of both feet. She

was given 0.9 gram of neoarsphenamine intravenously, and within three weeks all subjective symptoms had disappeared and the feet were healing rapidly. (Hyperhidrosis is known to clear up under potassium iodide and also to disappear without any treatment.) The history of the case and the nature of the lesions of the feet lead us to believe that this was tertiary yaws rather than secondary.

Of the organs of special sense the eye seems to be the only one involved. Granulomatous and papular eruptions appear upon the lids. Periostitis of the bony orbit may occur. The Colombo clinic reported two cases of iritis occurring during the granulomatous stage. In Samoa we have studied a condition which is identical with parenchymatous keratitis. It is with some hesitance that we mention such a diagnosis. Since parenchymatous or interstitial keratitis is universally recognized to-day as hereditary syphilis, finding such a condition in Samoa would in some minds establish the fact that syphilis is prevalent among the natives. If syphilis does not exist among the natives, which we have found to be the case, and a condition identical with hereditary syphilis but due to yaws does exist among them, we might come to the conclusion that yaws is hereditary.

In considering the genitourinary system it is not to be forgotten that the primary lesion is always extra-genital. The granulomata and papules of the secondary stage are numerous on the skin of the penis and labia. Harper reports that a granuloma of the vaginal mucous membrane is not uncommon.

Ordinarily the disease terminates with the secondary stage. *Tertiary* symptoms though may come on during the secondary stage or more frequently they appear much later. Sometimes the disease is latent for years. The skin and bones are the parts most frequently involved. Granulomatous nodules appear in the skin and subcutaneous tissues, and if untreated break down and form large deep ulcers with granulating fundi. Contiguous nodules break down and form serpigenous ulcers, but these are rare in Samoa.

Gangosa as it appears in Guam never occurs in Samoa. We have made a diagnosis of gangosa on six cases which gave a history of yaws and showed an ulcerative condition of the palate and nasal septum. Mink and McLean refer to a fulminating type of gangosa exceptionally seen in young children with symptoms suggestive of malignant diphtheria, and terminating fatally within a few days. A Latter-Day Saint missionary reported three such cases to us, but none have ever come under our observation.

The locomotive system suffers in the following way: Painful nodes develop under the periosteum, chronic periostitis may occur, and contractures are common. Deep ulceration may extend to muscles and the nerves may become involved in cicatricial contractures.

According to some, internal organs do not escape. Aneurysm considered to be of frambœsial origin has been observed. We have seen but one such case.

The quaternary stage or paraframbœsial affections. Tabetic symptoms and progressive paralysis after old infections have been placed on record by Harper and others.

The course of the disease usually covers a period of from three months to a year. The symptoms of the primary or secondary stage may completely disappear 10 days after one administration of neoarsphenamine. It may thus be cured or may only become dormant. The latent period may extend over many years. We had many cases with symptoms of the tertiary stage appearing six years after the secondary stage was supposed to have been cured by salvarsan. Stephenson's case had a long latent period and developed years after the man returned to a temperate climate.

The diagnosis of yaws in a country such as Samoa where it is endemic is always easy on account of the characteristic lesions and their development. The cases in our series that required any skill in differentiating them from syphilis were rare indeed. It is our opinion that the only sure differentiation in difficult cases is through histological examinations. The classical textbook differentiation can hardly be accepted to-day. The primary and secondary lesions are not always identical, there is a variation in the lesions, the mucous membranes may be involved, the viscera are not always spared, and cord and brain involvement has been reported. We still believe that the primary lesion is always extra-genital. One of Castelani's points of distinction is that yaws is not hereditary. We believe this point to be debatable.

In our series we have had to consider and differentiate yaws from the following conditions: Tropical ulcer, lupus, molluscum contagiosum, kerion, leprosy, and keratoma plantare sulcatum. In the secondary and tertiary stages with bone involvement the only other conditions we have had to consider were syphilis, tuberculosis, sarcoma, cysts, and fibrous osteitis.

Prophylaxis against yaws consists of isolating all cases, treating all abrasions with antiseptics and protective dressings, and the destruction of all flies and their breeding places. The methods adopted in American Samoa for the control and eradication of yaws are:

I. *Preventing its introduction from foreign ports.*—1. All passengers and crew of any vessel arriving in American Samoa are inspected by the public health officer.

2. Any passenger found to have open lesions of any description is sent to the Samoan Hospital and held until cured, or until in the opinion of the medical officer he is not a source of infection. (Law.)

3. The vessels that bring these persons are required to pay for their hospital and medical treatment. (Law.)

4. All passengers suffering from yaws upon arrival are subject to deportation upon the vessel on which they arrived. (Law.)

5. Any vessel bringing a passenger to American Samoa who is suffering from open lesions of yaws, which, in the opinion of the public health officer, could have been detected at the time of embarkation, is subject to a fine of \$100. (Law.)

II. *Isolating and treating all cases of yaws.*—1. The pulenuu or chief of each village is required to send all cases of yaws to the hospital or nearest dispensary. (Law.)

2. The pulenuu of each village is required to report to the sanitary inspectors all cases of ulcers or skin infections that exist in the village. (Law.)

3. Sanitary inspection of each village twice a month.

4. Each village is visited twice a month by visiting nurses.

5. All cases are isolated and kept under treatment until they are no longer a source of infection.

6. Hospital and medical treatment are free.

III. *The destruction of flies and their breeding places.*—1. The construction of fly-proof latrines in all villages. (Law.)

2. Each village required to properly dispose of all garbage and débris daily. (Law.)

3. Each village required to collect and dispose of daily all fallen breadfruit. (Law.)

4. Inspections by medical officers or chief pharmacists' mates twice a month.

5. Issuing circulars in regard to sanitation, in the Samoan language.

Treatment.—All lesions should be dressed, the nature of the dressing depending upon the condition of the lesion, and the local treatment does not vary from the accepted standard treatment of all similar skin conditions. Local treatment alone has no effect on the general condition.

Potassium iodide, when indicated, is of great value. Mercury internally has been thought to do good in some cases.

One injection of arsphenamine or neoarsphenamine is not sufficient to effect a cure. We have found that at least three injections of a sufficient amount, over a period of not more than three weeks, will give the best results. The intravenous method is the one of choice and should always be employed whenever possible. Never less than 0.3 gram of neoarsphenamine is given intramuscularly to children when a vein can not be conveniently used, and 0.9 gram of neoarsphenamine intravenously is the initial dose for the average adult.

ELIMINATORS.

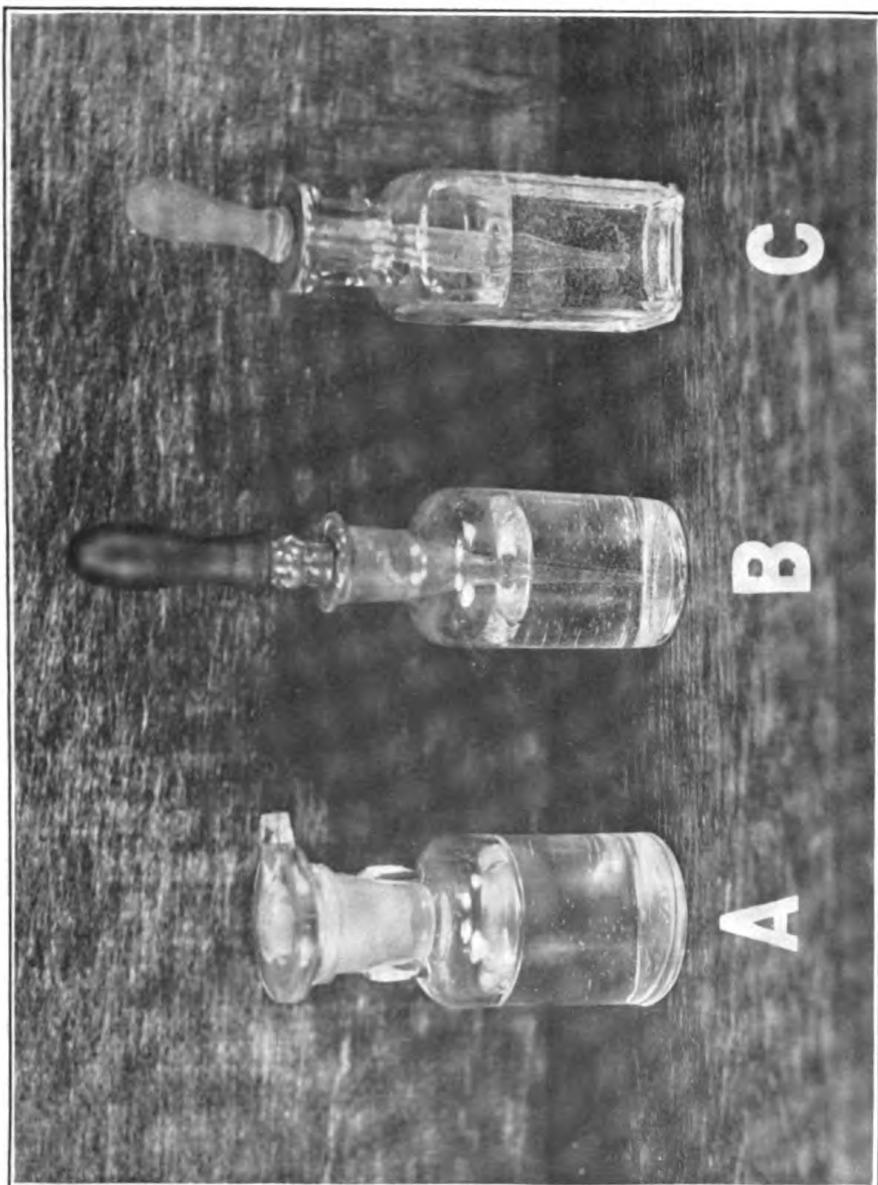
By H. E. HARVEY, Lieutenant Commander, Dental Corps, United States Navy.

The success attending the use of Doctor Knapp's wax eliminator has brought to our attention the word "eliminator," and this seems quite an acceptable term for designating certain devices to be herein described.

Reference to the illustration will show three articles, "A," "B," and "C," which represent variations in an attempt to attain the same result, namely, the transferring of a small quantity of liquid from a container to a receptacle, with speed, accuracy of aim, and certainty, and incidentally doing away with the necessity for wiping away or otherwise disposing of the last drop. It is this latter, hanging from the bottle lip, which so often causes an unsightly appearance as it seeps down the side of the container, collecting dust and often becoming gummy as the result of evaporation or oxidation.

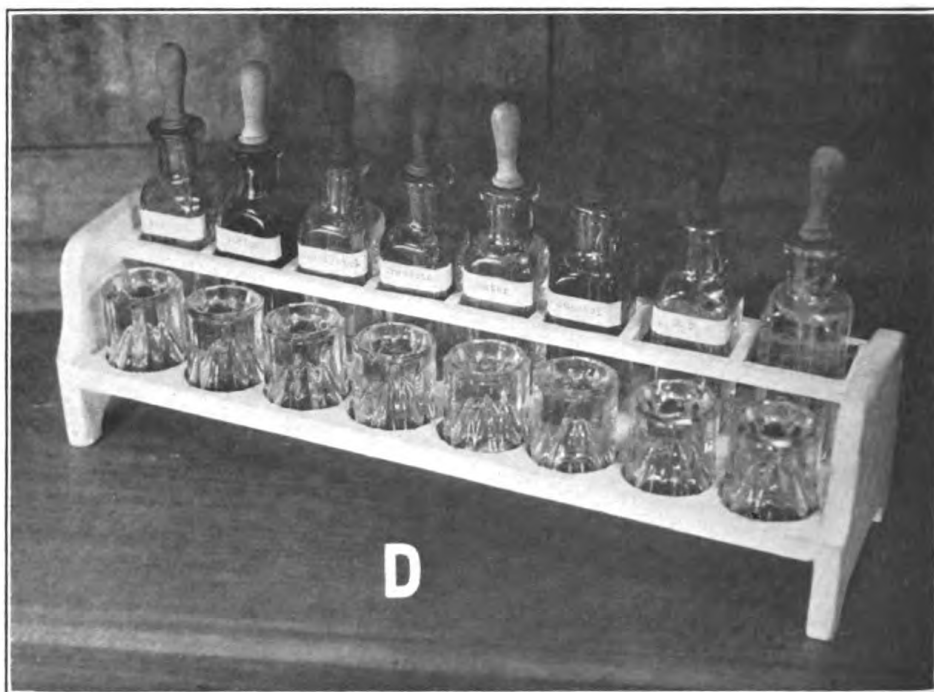
After a glance at "A" it would seem that no extended explanation is needed in connection with the name which has been selected for this little article, that of "patience eliminator." Patience, usually considered a virtue, has its limit, and experience is daily demonstrating that this appliance deserves a place on the border line of this limit, if not over it, in connection with its use for the various medicaments in a dental office. Theoretically it should provide, with a simple twist of the wrist, means of getting a few drops more or less of the contents of the bottle. However, it does not seem to do this unless the bottle contains water, and even then the results are not always certain. If the contents happen to be tincture of iodine or essential oils, the chances are that the twist of the wrist can be started but not completed, and if by glad chance the stopper does revolve the liquid will not drop. Removal of the stopper is then indicated unless a sudden determination to use something "just as good" strikes one simultaneously with the immobility of this theoretical dropper stopper, which on second thought might well have been called a "stopper" dropper. The patient waiting with mouth open may be amused at the unavailing attempts to remove this stopper, for with a recollection of our physics a quick move is made to expand the neck of the bottle in the flame of the alcohol lamp. Sometimes this works. In urgent cases a crack encircling the neck of the bottle, from the heat, is noted with relief, and one breathes more easily as the neck, stopper and all are neatly lifted from the bottle, with a silent "Never again."

The center object in the line of three, "B," has been christened the "temper eliminator," so-called principally because it has no lead in its bottom and grasps the slightest excuse to tip over. The



A. PATIENCE ELIMINATOR. B. TEMPER ELIMINATOR. C. PROFANITY ELIMINATOR.

608-1



MANEUVER ELIMINATOR.



MANEUVER ELIMINATOR IN USE.

608-2

soiled table or cabinet of this result of being down and out gives rise to the appellation "temper." This little bottle fitted with a ground glass pipette as its stopper shows an unreasonable tendency at all times to hang onto this stopper, "with the perversity of inanimate objects," to quote the words of Dr. G. B. Tribble.

The third object, "C," deserves its name of "profanity eliminator," for, while it has not any lead in its bottom, it maintains its equilibrium under stress and likewise furnishes extreme mobility for the stopper dropper, both coming and going. The name seems self-explanatory. To prevent the possibility of dust collecting on the rim of the bottle and entering as the dropper is removed, a washer of 30-gauge German silver is made which will cover the top of the bottle; this contains a hole slightly larger in diameter than the circumference of the glass portion of the dropper. The washer is slipped over the glass and secured loosely from below with a small rubber band, this gives sufficient play for the metal to adapt itself to the bottle rim as the dropper hangs in the bottle. A thin coating of vaseline on the under surface of the washer makes a seal contact as it drops to place.

The "maneuver eliminator" is self-explanatory, being merely a collection of "profanity eliminators" arranged with regard to speed, accuracy of aim, and certainty. It seems to present several meritorious features, which for the sake of brevity will be listed.

(a) Accessibility; it is designed for the top of the cabinet.

(b) Compactness; provides an orderly unchanged arrangement for medicaments.

(c) Efficiency; requires in operation but one movement of each hand, namely, the right hand to remove and invert the medicine glass, and the fingers of the left to fill dropper, remove it, place liquid in medicine glass, and return to bottle. The return of the dropper automatically seals the opening of the bottle, preventing evaporation, odors, and the ingress of dust.

(d) Safety; keeps bottles from being upset or thrown against each other.

(e) Speed; eliminates the necessity of opening cabinet doors to obtain the medicament bottles and the medicine glass. Ordinarily one hand must be used to hold the bottle and the other to remove the stopper, the medicine glass having been first placed in position as a separate operation, the liquid is then poured with a shake or touch to remove the last drop, the stopper is reinserted and the bottle returned to its resting place.

(f) Sanitation; first, objections have been raised on several grounds to the insertion of cotton pellets into medicaments in orig-

inal containers; second, lessens chance of contamination of bottle with infective material from the fingers, which can be further reduced by using the fingers of the left hand to remove and return the dropper and those of the right hand to remove the medicine glass from the stand and at the same time to invert it to present a receptacle free from dust. The Dappen glasses, or medicine glasses so called, are cleansed after each operation in which they are used.

EDITORIAL.

THE NAVAL DENTAL SCHOOL.

The establishment of a naval dental school as a department of the Naval Medical School at Washington is one of the outstanding features in the educational program of the Surgeon General that has met with distinct and general approval throughout the service.

It has long been recognized that something should be done to enable the dental officers to keep abreast of modern thought in their specialty, which is rapidly assuming a degree of importance in the eyes of the medical world as a factor of considerable value in maintaining the public health. The establishment of the school is expected to be of material benefit.

This school opened February 5 with a class composed of 5 dental officers and 10 hospital corpsmen who are to undergo a course of training extending over a period of four months.

The course for officers embraces modern methods in clinical dentistry as taught in the leading dental educational institutions of the country, and includes post-graduate instruction in prosthetic technic, which latter will be adopted as rapidly as is deemed practicable, as a part of the dental service furnished officers and men of the naval establishment.

Instruction in medical diagnosis, bacteriology, pathology, and allied subjects are given student dental officers by the faculty of the Naval Medical School in conjunction with the regular class of student medical officers, the more technical subjects being taught by dental officers who have received special instruction at the Northwestern University in Chicago, Mayo's Clinic at Rochester, Minn., and other well known clinics whose special technic has been deemed worthy of particular attention.

Considerable time has been devoted to a comprehensive course in radiology and minor oral surgery designed to be of great diagnostic and operative assistance in naval hospitals and included in the curriculum is a series of lectures on preventive dentistry.

The hospital corpsmen who are undergoing instruction are being given a thorough training in mechanical dentistry, oral prophylaxis, chemistry, metallurgy, and operative assistance. This feature of the school will result in the creation of a force of trained assistants to the dental officers, which is expected to add much to the efficiency of the Naval Dental Corps.

PILONIDAL CYSTS.

Congenital sacrococcygeal cysts are usually classed as rare lesions, but they appear with surprising frequency after the operator has once been fooled by one and is watchful when examining patients with rectal disorders. In the surgical service of the U. S. Naval Hospital, Mare Island, seven cases were seen in 27 months, and on the U. S. S. *Mercy* five have been noted in the past year.

They are sequestration cysts having their origin from the remnant of the postanal gut and are due to fetal inclusion of dermal anlage. At an early stage in the development of the embryo the alimentary canal and the central canal of the spinal cord are continuous, forming the neurenteric canal. The proctodeum invaginates and joins the gut at a point anterior to the opening of the neurenteric canal. The part of the intestine posterior to this opening is the postanal gut and it normally disappears, leaving only a trace, the coccygeal gland of Luschka. Abnormally, embryonic tissue may persist, in the form of dermoid or epidermoid cysts. True dermoids in this region are rare. The type of cyst usually observed is lined with glandular epithelium, may be unilocular or multilocular and is filled with mucus, cellular debris, sebum, and hair.

Though they are congenital in origin, these cysts are usually not observed until young adult life when the increased activity of the glands and the accumulation of their secretions distends the cyst. Then they frequently suppurate and may be mistaken for the usual type of ischiorectal abscess. The surgeon rarely sees them before this stage. After repeated inflammation and the formation of several sinuses they may resemble tuberculosis of this region. When seen before rupture they are usually fluctuating swellings about the size of a cherry, located near the tip of the coccyx and adherent to the skin. Frequently the patient first becomes aware of the lesion after being bumped or kicked and regards the injury as the cause of the trouble. Pain, suppuration, softening, and rupture usually follow. They are frequently treated by incision and drainage but this does not cure them, and they recur again and again, after repeated incision and curettement, until the true condition is recognized and properly treated. Sometimes there is observed a deep dimple with a few hairs growing from the bottom. If this is deep enough to form a pocket and make cleanliness difficult, chronic inflammation and suppuration may occur and be curable only by dissecting out all the epithelial tissue.

Complete dissection and removal of all secreting tissue is the only satisfactory treatment. Frequently this is very difficult and requires extensive dissection and removal of a part or the whole of the coccyx in order to reach sinuses anterior to the sacrum. Injection of colored

fluid is of assistance in following the narrow and tortuous sinuses which are frequently found. After all of the lining membrane has been removed the walls should be approximated by sutures to obliterate the cavity. If there is any doubt that all has been removed it is better to pack the wound and keep it open until this is determined.

SENSITIZATION DISEASES.

The entrance of an undigested foreign protein either of animal or vegetable origin into an animal produces profound chemical and immunological changes in the tissues. As is well known, the first dose of a foreign protein injected is followed by an increased susceptibility for that protein and the symptoms which follow the re-injection of the protein after a properly spaced interval constitute a syndrome called anaphylaxis, hypersusceptibility, or allergy. An animal once sensitized to a certain protein may remain so for a long period, but the sensitiveness can be made to disappear for a short period of time immediately after the recovery from a nonfatal dose of protein. This period is called the period of desensitization, and upon it is based the rationale of treatment in anaphylactic disease.

The relation of sensitization to many disease entities has been the object of much study in recent years. The diseases now classed as some phase of allergy are: Serum disease; hay fever, both seasonal and perennial; asthma; certain skin affections, notably urticaria and eczema; certain forms of conjunctivitis.

Serum disease with serious symptoms may follow the administration of horse serum in the treatment of hemorrhage, diphtheria, pneumonia, and epidemic meningitis. The sensitiveness to horse protein may be due either to previous injections of serum or by the absorption of horse dander or horse emanations through the mucous membrane of the respiratory tract or the conjunctiva. No patient should receive a dose of foreign serum, especially if it is to be administered in large amounts, before it has been determined whether or not he is sensitive to it. This may easily be ascertained by the intracutaneous injection of $1/50$ to $1/20$ of 1 c. c. of the serum. If the patient is sensitive, a reaction, consisting of an urticarial wheal surrounded by an area of erythema, will appear within a half an hour at the site of the injection.

It is known that in man, as in experimental animals, the severity of the symptoms bears a definite ratio to the amount of serum given and the mode of injection. Thus, second injections in the guinea pig are much more fatal when given directly into the circulation than into the subcutaneous tissue. It is sometimes advisable to give antitoxic sera directly into the circulation, but in susceptible persons

this would be hazardous. It has been found possible to avoid all symptoms of anaphylaxis in experimental work with guinea pigs by injecting the serum extremely slowly in small amounts, and this observation has been verified and the method found useful in man.

Seasonal hay fever has been definitely grouped as an allergic disturbance and is produced by a sensitization to pollen proteins. The disease is manifest when a sensitized person receives a repeated dose of pollens, which occurs only when the plants pollenate. In the modern treatment of this condition the patient is tested with the pollens of many varieties of trees, grasses, and plants in order to find which is responsible for the condition. When the patient has been tested and the pollen to which he is sensitive is found, the patient is desensitized by means of an extract of the pollen administered in increasing amounts before the next season of pollenization. The tests are made by cutaneous or intracutaneous application of the suspected pollen. The reaction produced, if the patient is sensitive, appears in about 20 minutes and consists of an urticarial wheal and an adjacent area of erythema.

The rationale of the desensitization and immunization against the exciting pollens, according to Dr. Andrew A. Eggston who writes on this subject in the *Laryngoscope* of November, 1922, is based upon the following biological fact: "A protein-sensitive animal when injected with a sublethal dose of protein will manifest mild symptoms of shock; and if it does not die, will not react to subsequent larger doses of the same protein. This refractive period has been called the period of desensitization and antianaphylaxis. This period is temporary only as the animal again becomes sensitive after an interval of time. This occurs in hay-fever treatments; the patient will experience a brief period of relief from the injections. For this reason the treatments should be scheduled so that a patient is getting injections up to the time of the hay-fever season. If this brief period of relief were the only value of the injections it would hardly seem worth while. A dual effect is obtained from the injections and this is in the nature of a permanent immunization to the pollens, as about 7 per cent of the hay-fever cases are permanently cured with one series of treatments while in the remaining number there is a decreased sensitization to the protein and the patient can receive much larger doses in the treatment the second or third year."

Pollen extracts are prepared in the laboratory for the treatments and diagnosis of the hay-fever cases. The technic used in administering the pollen extracts is briefly, as follows:

In the treatment of cases 1 to 100 dilution is the weakest solution used. This is done by employing a tuberculin syringe, giving 0.01, 0.03, 0.05, 0.07, and upward to 1 cc. All injections are given in the

same anatomical location, i. e., arm or thigh. It has been noted that a distinct local tolerance to the extracts from the injections and large doses can be endured without reaction if this rule is followed. If large doses are given in areas not previously desensitized, severe reactions may occur. Treatments may be given intravenously to those cases that have been under treatment for some time and which have received the maximum dosage of 1 cc. of 1 to 100 dilution subcutaneously, the first dose intravenously being 0.02 cc. of 1 to 100 dilution and the dosage increased, as indicated by the reactions of the patient. The intravenous method is not without some reactions in some cases, but the results in the cases so treated have been gratifying. This method, however, should not be generally advocated, and further experimentation is necessary before we are justified in advocating intravenous administration of pollen extracts. Eggston obtained the following results in 130 cases with treatment, as above indicated:

	Total relief.	Some relief.	No relief.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
First year.....	7	63	30
Second year.....	16	64	20
Third year.....	23.6	69.4	7

Recently Mackenzie (Jour. A. M. A., March 18, 1922), has shown that it is not necessary that the antigen (pollen or protein extract) be injected into the tissues in order that increased tolerance may be produced. Merely bathing the exposed surfaces of the cells has the same kind of effect as when the antigen is introduced into the tissues.

Mackenzie employed a nasal spray of increasing strengths of the extract to produce tolerance to the specific protein.

In perennial hay fever, the etiological factor is not always easily determined. The cause may be found in a focus of infection, particularly of the intestinal tract. Endocrine dysfunction is responsible in some cases while others are due to protein sensitization. The proteins responsible for this variety of hay fever must be sought for in food, among the bacterial proteins and animal emanations.

Pulmonary asthmatic attacks are of three distinct types, viz, anaphylactic spasmodic contraction of the bronchial musculature, bacterial infection, and a combination of sensitization and infection.

The first type is due to the deposition of the protein upon the respiratory passages of a sensitized person.

Spasmodic asthma is true anaphylactic asthma and is a local manifestation of a general condition the same as hay fever. The

proteins responsible for this form of asthma are to be found among animal emanations, food, and bacterial proteins, various powders, and dusts. The animal emanations most commonly responsible for spasmodic asthma are from the horse, dog, rabbit, chicken, and goose. The foods responsible are of infinite variety. According to Eggston, bacterial protein sensitization asthma is rare and there is doubt in his mind of its actual existence.

The treatment of anaphylactic asthma consists of elimination of the offending protein or the desensitization and immunization of the patient to the extracts made from the offending substances.

Eggston writes as follows concerning infective bronchial asthma:

“Classically a pyogenic inflammatory infection of the bronchial mucosa, lymphoid tissue, and musculature of the bronchi by bacteria. These bacteria and their toxins periodically irritate the vasoconstrictor mechanism of the bronchioles, producing a spasmodic obstruction of respiration. The infective type also produces a chronic obstruction to the bronchi by inflammatory thickening of the mucosa of the passages. In the infective types and mixed forms the treatment consists of drugs, nonspecific proteins, vaccines, operative procedures, climatic, and general supportive measures. Vaccines are of frequent aid in the infective types, while procedures relieving foci of infections in the teeth, sinuses, tonsils, and gastrointestinal tract will entirely relieve some of the cases. Autogenous vaccines are given in strong solutions and in large doses. The vaccines are made fresh every four weeks and treatment continued over a long period of time. A combination of the sensitization and bacterial invasion frequently exists. The sensitization asthmas are prone to become infected. It frequently requires long study and patience to get at the fundamental facts in an asthmatic patient.”

Certain cases of eczema, urticarial and angioneurotic edema, and chronic conjunctivitis have given sensitization to proteins, and Eggston produces evidence to show that some cases of acute indigestion are simply acute manifestations of anaphylaxis.

The prognosis of sensitization diseases has been decidedly more favorable since the discovery of their etiology and there are probably no lines of medical investigation which offer more promise than the study of allergy.

SOME GENERAL PRINCIPLES IN THE TREATMENT OF THE DIARRHEAS.

Not many years ago the treatment of the diarrheas was purely empiric, but with increased knowledge it rests on a more scientific basis. Recent advances include a more skillful and exact employment of diet than in the past, a more precise utilization of drugs, and the introduction of transduodenal lavage.

The diarrheas may be divided into two great groups—functional and organic—a division which is of immense clinical importance, inasmuch as the first practical question to decide before instituting treatment is whether the process is or is not associated with a demonstrable lesion or infection of the intestinal tract.

The differentiation between these two chief divisions is not difficult. If the stools contain blood, pus, and mucus, with or without specific causative organisms, and if endoscopic examination of the lower bowel shows actual inflammatory or ulcerative changes, the diagnosis of organic disease is justified. The diarrhea resulting from an organic condition is apt to be continuous and accompanied by persistent pain and tenderness along the course of the colon, together with positive Roentgen findings and the signs of systemic involvement—cachexia, anemia, fever, and severe emaciation. On the other hand, the course of a functional diarrhea is self-limited and the stools are persistently free from blood, pus, mucus, and specific organisms, the endoscopic and Roentgen examinations are negative, and the general condition is fair or but little affected.

According to Dr. J. L. Kantor, of Columbia University, who writes on this subject in the *Medical Clinics of North America* for November, 1922, when discussing the generally recognized principles governing the treatment of all forms of diarrhea, one must consider general body rest, diet, specific measure, local treatment, and drug therapy.

Rest in bed is the first measure to apply in the treatment of any case of diarrhea, because of the accompanying decrease in all smooth-muscle activity, and specifically, all peristaltic action. With rest in bed one can conveniently combine various physical methods of treatment, such as the application of heat for the purpose of diminishing peristalsis and controlling colic and abdominal discomfort in general.

The patient's food should be well subdivided, free from irritants, readily assimilable, and thoroughly cooked. Vegetables and cereals should be well mashed, strained, or passed through a sieve.

All foods containing much cellulose, as fruits and coarse vegetables, and all irritating and stimulating substances, such as spices, alcohol, etc., should be avoided.

In most acute diarrheas, and at the beginning of treatment in many of the chronic forms, a starvation period of 24 to 48 hours may aid in hastening recovery. The rest interval should be preceded by a quickly-acting purge such as castor oil, in order to insure the elimination of all irritating or fermenting products that may be present in the intestine.

As Kantor points out, the intestinal diet introduced a few years ago by Adolf Schmidt is of the greatest usefulness in the study of the chronic diarrheas of the functional variety.

"This diet," says Kantor, "takes the same place in the investigation of intestinal disorders as does the Ewald meal in testing out the functional capacity of the stomach. The Schmidt diet is so well balanced as regards its composition in the principal basic foodstuffs that the normal intestine digests these substances without the appearance of excessive residues in the feces. On the other hand, should examination of the stools reveal undigested meat, fat, or starches after a three-day Schmidt regimen it is safe to assume that the diarrhea in the case in question is due to an inability to handle the class of foodstuffs that appear unchanged in the excrement."

SCHMIDT INTESTINAL TEST DIET.

Breakfast :

- One pint of milk, or tea or cocoa, prepared with much milk.
- One buttered roll.
- One soft egg.

10 a. m. :

- One large plate of thick oatmeal soup, strained, cooked with milk and water, and flavored with sugar or salt.

Dinner :

- One large plate of thick potato soup.
- One-quarter pound chopped or scraped beef, slightly browned in the pan.

4 p. m. :

- Same as at breakfast without the egg.

Supper :

- Same as 10 a. m., with one or two buttered rolls, and one or two soft or scrambled eggs.

The Schmidt diet is of real therapeutic value in some diarrheas, particularly the fermentative type. Often the diarrhea disappears entirely by the time the test is completed or is so reduced in degree that but few further changes are required in the feeding process to secure a successful result.

In the treatment of diarrhea certain specific measures may be employed. Where there is lack of some of the digestive secretions a specific replacement of the deficient secretion may be beneficial. The use of hydrochloric acid in the diarrhea of achylia gastrica or the administration of the missing ferments in certain cases of pancreatic insufficiency are examples of this type of therapy. Specific therapy is also directed against certain of the infective organisms which cause diarrhea as the dysenteric amebae, the dysenteric bacilli, some of the flagellate protozoa, and the parasitic worms.

The object of local intestinal treatment is to clean out the bowel of irritating or infectious material, to overcome infection through antisepsis and to soothe or allay intestinal irritability. For gross cleansing purposes the use of castor oil is of acknowledged value. Recently the use of transduodenal lavage has been advocated. This

method was first introduced by M. E. Jutte, who describes it in a paper which appeared in the New York Medical Journal of March 16, 1912. Duodenal lavage flushes out the entire length of the intestinal canal from pylorus to rectum. For the lavage to be effective the irrigating solution must be nonabsorbable and employed in sufficient bulk to thoroughly flush the bowels. Jutte uses warm hypertonic saline solution (1,000 cubic centimeters contains 9 grammes each of sodium chloride and sodium sulphate), introduced by means of a duodenal tube. This treatment is followed within an hour by from one to three watery evacuations.

Many cleansing and medicinal irrigations are useful per rectum, especially in the protozoal diarrheas. In general they are to be given twice daily with a double flow tube and as much fluid is to be used as the patient can stand or until the rectum is clear. Plain tap water may be used or normal saline solution or various drugs in solution, such as calcium chloride, sodium bicarbonate, quinine, tannic acid, silver nitrate, or potassium permanganate. Lime water is said to be very useful for the disintegration and removal of mucus accumulations.

As a soothing measure retention enemas of starch paste or olive oil, either alone or combined with bismuth subnitrate are of value, especially in controlling tenesmus and colic.

The drugs used in the treatment of diarrhea, although of secondary importance in the therapy of the condition, may be considered under two groups, the antidiarrheics and the astringents. As Kantor points out, the antidiarrheics act on the nervous system and the neuromuscular control of the intestine. Opium and their alkaloids produce their effects by depressing the reflex irritability of the intestine to stimuli. The astringents combine various qualities which make them of considerable value in the treatment of diarrheas. By precipitating albuminoids they increase the consistency of the intestinal content. This precipitating action has been shown to extend to the superficial layers of the intestinal mucosa which is thus protected against chemical and mechanical irritants while secretion and transudation are diminished. Of the astringents the bismuth preparations are the most useful. Bismuth acts as a mechanical protective to the intestinal mucosa and has the added virtue of combining with H_2S in the intestine and removing this irritant by excreting it in the form of bismuth sulphide.

The silver astringents are used only for intestinal irrigations. Calcium salts are astringent and tend to decrease peristalsis, calcium carbonate being the form most commonly administered by mouth.

A CHRONICLE OF TUBERCULOSIS.

Our earliest knowledge of the disease now known as tuberculosis dates from the fifth century B. C., when Hippocrates held that phthisis was a suppuration and ulceration of the lungs. His definition of phthisis was very comprehensive, including empyema, abscess of the lungs, and gangrene. He believed the disease was due to pneumonia which failed to resolve, hemorrhage into the bronchi and to nasal secretions dropping down into the lung. So great was the authority of Hippocrates that these views prevailed for 2,000 years. Hippocrates makes no mention of phthisis being contagious. But Aristotle seems to have held that it was so; and Galen said, "It is dangerous to live with consumptives."

There was no real advance in the knowledge of the disease until the seventeenth century when, a few years after Harvey's demonstration of the circulation of the blood, Franciscus Sylvius, in Holland, published his assertions that tubercles are often found in the lung of patients dying of consumption, and that these tubercles softened and became cavities. He believed, however, that these tubercles were only enlarged glands which were supposed to exist in the lungs.

Richard Morton, who lived in the latter part of the seventeenth century, embraced Sylvius's view concerning the glandular origin of tubercles, but he made an important contribution to the subject when he maintained that tubercles are to be found in all cases of consumption. He expressed a firm belief in the widespread occurrence of tubercle, and he pointed out the frequency with which healing takes place.

Thomas Willis, a contemporary of Sylvius and Morton, was the first to controvert the prevailing belief that phthisis invariably depended on ulceration of the lungs. He had examined post-mortem bodies of men dying of this disease in which the lungs were free from an ulcer and yet they were "set about with tubercles or sandy matter throughout."

Pierre Desault, in the beginning of the eighteenth century concluded that, as the symptoms of phthisis precede the formation of ulcers in the lung, they are due to the tubercles.

William Stark, who died in 1770, gave an excellent anatomical description of the tuberculous lung, and Matthew Baillie a few years later gave so clear and complete a description of the pulmonary lesion of phthisis that it could hardly be bettered to-day. The existence of tubercles in other organs as well as the lungs did not escape his observation, but he failed to see any connection between them.

Among the first of the great workers at the beginning of the nineteenth century was Bayle, whose attention was directed to the co-

existence of tubercles in various organs. He traced this dissemination to a common cause, a special disposition to the formation of tubercles or tuberculous diathesis, and he called the disease tuberculosis. He is said to have been the first to use the term "miliary tubercle."

In 1819, Laennec published his memorable work on *Mediate Auscultation and Diseases of the Lungs and Heart*, a work which revolutionized the theory of consumption and the clinical methods of examination of the lungs. He was convinced that all phthisis is tuberculous and stated that tubercle may take the form of discrete nodules or diffuse infiltrations; that softening of tubercle causes excavation and discharge of pus through the bronchi, forming cavities or ulcers of the lungs; that all cheesy matter is tuberculous; that tubercles may arise in any organ. Laennec regarded scrofulous glands as tuberculous, and he maintained that hemoptysis is the result not the cause of phthisis.

Laennec's views did not win universal assent at first and many able men including Virchow and Niemyer sought to controvert them. In 1857, Buhl made the important observation that disseminated miliary tuberculosis is always associated with the presence of a caseous focus in some part of the body which is the starting point of the infection. In 1865, Villemin announced his discovery that tuberculosis is an infective disease which can be conveyed to animals by means of tuberculous matter derived from man. He considered that tuberculous sputum is the chief source of tuberculosis. As in the case of Laennec, his conclusions were hotly contested.

In the same year in which Villemin made known his views, William Budd, from a study of the disease in its epidemiological and geographical relations, came to the conclusion that tuberculosis is an infectious disease; but it was not until Robert Koch announced his discovery of the tubercle bacillus in 1882 that the doctrine of infection found general acceptance among clinicians. •

The establishment of Koch's postulates completely revolutionized the attitude of the medical profession both to diagnosis and treatment, and great controversies regarding many aspects of the disease took place. According to Dr. Percy Kidd, who recently delivered at the London Hospital Medical College the Schorstein memorial lecture on a Retrospect of 40 Years in the History of Tuberculosis, it seems that the first of these controversies was precipitated in 1901 when at the Tuberculosis Congress held in London, Koch made the startling pronouncement that, as the result of extensive experiments, he had come to the conclusion that human and bovine tuberculosis are not identical diseases. He expressed himself as being convinced that human tuberculosis can not be communicated to cattle, whereas when these animals are infested with bovine tubercle bacilli severe

generalized tuberculosis invariably follows. The question of the infection of man by bovine tubercle bacilli could not be so satisfactorily settled, but Koch considered this to be so improbable that it was not necessary to recommend precautions against it. He believed the main source of human tuberculosis to be the sputum of consumptive patients.

Two years later von Behring challenged Koch's conclusions and asserted that milk is the main source of tuberculosis. This controversy has raged even up to the present time, but it seems now to be generally agreed that Koch was correct. The morphological and cultural differences are not very great, and perhaps not quite constant, but that the two varieties exhibit pathogenic differences can not be doubted.

The mode of entrance of the tubercle bacillus also has been subject to controversy. The view of Villemin and Koch that in pulmonary tuberculosis the bacillus enters the body through the air passages was generally accepted at first. But Calmette and others subsequently attempted to show that the bacillus is swallowed with food, passing from the alimentary canal to the abdominal lymphatics and thence reaching the lymphatics of the thorax and infecting the lungs.

The value of tuberculin, the position of the primary tuberculous lesion in the lungs and the value of the X-ray in the diagnosis of early active lesions are still matters of controversy.

Speaking of diagnosis in his lecture, Doctor Kidd remarked:

"X-ray examination is a valuable help in the diagnosis of pulmonary diseases, but it can not reveal the earliest stage in the formation of a tubercle, and it is doubtful whether it can enable us to differentiate between active and quiescent disease. * * * While we recognize the valuable confirmatory evidence furnished by the radiologist, we must still rely for early diagnosis and also for prognosis on the well-tried methods of physical examination combined with a careful consideration of all the patient's symptoms. * * * It was hoped that the application of the complement fixation test would fill the gap in our means of diagnosis, but opinion is still divided concerning its merits."

In reviewing the advances made in the treatment of pulmonary tuberculosis in the last 40 years, Doctor Kidd points out three methods which stand out as new departures that have attained to some measure of success. These are, in chronological order, the sanatorium method, tuberculin, and the induction of pneumothorax.

In 1890 Koch introduced the subcutaneous injection of tuberculin as a specific immunizing agent against tuberculosis, and the failure of this method to meet the anticipations of the medical profession

is well known. Koch taught that the tuberculin should be given in increasing doses until a high degree of tolerance was attained. This was assumed to indicate that all active tuberculous foci had been destroyed. Many workers, especially Sir A. E. Wright, began using tuberculin on a different principle, employing minute doses continued over long periods of time and increased so gradually as to avoid all constitutional reaction. This plan of administering tuberculin and its many modifications was given a prolonged trial, but in the case of pulmonary tuberculosis the results were disappointing. Better results have attended its use in cases of chronic tuberculosis of lymphatic glands, bones, and joints. In spite of the meager results of tuberculin treatment many workers believe it probable that Koch's researches indicate the lines along which ultimately success may be achieved. Doctor Kidd called attention to the fact that a tuberculous patient may acquire a high degree of tolerance to tuberculin without any corresponding improvement in his malady; in other words, tuberculin tolerance does not necessarily imply arrest of the tuberculous process as Koch thought.

The sanatorium treatment of tuberculosis as we know it to-day is mainly based on the lines laid down by Walther of Nordrach. Its essentials are: Abundance of fresh air, a generous diet, rest, and exercised under the personal supervision of a skilled physician. Graduated exercise by provoking autoinoculation and favoring the acquisition of immunity has proved useful in suitable cases.

It is not claiming too much to say that the sanatorium treatment has given better results than any other so far. Speaking in this connection, Doctor Kidd remarked: "In the well-to-do classes one has seen many instances of arrest, lasting over years, the patients being able to live useful and sometimes laborious lives. In the less successful cases life has been prolonged for 5 to 10 years, often with a fair measure of health. One of the great merits of sanatorium life consists in its educative effects, not only on the inmate himself but also indirectly on his family and acquaintances. The public generally are undoubtedly more alive now to the importance of fresh air, cleanliness in the house, disposal of sputum, and general hygienic measures than they used to be. In my opinion some of the credit of this improved state of opinion must be assigned to the influence of the sanatorium movement. The complexion of the average case of consumption seems to me to have changed in the last 40 years. Rapidly progressive cases are now less frequently met with in my experience, whether in private or in chest hospitals. As an adjunct to the hygienic measures of the sanatorium brief mention may be made of heliotherapy. The beneficial results of sunlight in tuberculous disease have been clearly demonstrated in chronic cases.

more particularly where the serous membranes are chiefly concerned. Unfortunately, our climate during many months of the year does not provide the needed amount of sunshine. But at these times, for those who can afford it, the high Alpine stations of Switzerland are available and offer special facilities. Careful supervision of the treatment is essential if the ill effects of over-exposure to the sun's rays are to be avoided."

The induction of artificial pneumothorax was first employed in recent times by Forlanini in cases of severe progressive pulmonary tuberculosis in order to produce collapse of the lung and thereby secure immobilization and rest of the diseased organ.

The results of the pneumothorax treatment in England have recently been reviewed in a report of the tuberculosis committee of the Medical Research Council. The committee concluded that the results are highly favorable in selected cases. "For patients with a good power of resistance the operation is not indicated, as such cases do well with sanatorium treatment. On the other hand, in cases of low resisting power and progressive disease little benefit can be expected. But in an intermediate class, where the disease is subacute and the healthier lung is not too much affected, pneumothorax gives the best results."

NOTES AND COMMENTS.

The *Lancet* which finds its way weekly to all of our naval hospitals well deserves the following comment which appears in the *New York Medical Journal* from the pen of one writing on the progress of medical journalism during the past 100 years:

"The progress of medical science in all its branches during the past 100 years has exceeded that of any previous period of the same length. This is to say that more important discoveries have been made, side by side with greater advances in clinical medicine and surgery. Pasteur, whose centenary has just been celebrated, revolutionized the practice of medicine by the results of his investigations into germ life, and helped to render it a more or less exact science. Without the aid of medical journalism progress might have been much slower. Intelligent, shrewd and sane journalism is a potent force for spreading knowledge and for forming opinion.

"The *Lancet*, which at the close of this year will have been in existence for 100 years, has been a pioneer in this direction. It may thus be classed as fittingly representing medical journalism. Established in 1823 by Thomas Wakley, one of the most fearless of reformers, it has played a part in the introduction of most of the reforms which have taken place in the British medical profession and in all things appertaining to medicine and health in Great Britain since its foundation. Its journalistic activities have not been confined to the country of its birth, but by publishing news of medical interest it has fulfilled the original and ambitious intention of its founders to notice medical affairs in England 'or in any part of the civilized continent.'

"The *Lancet* supplies an excellent illustration in point of the strides made by medical journalism. In the first number issued on October 1, 1823, clinical notes from three widely separated towns were published, an earnest of the avowed intention of giving news from far-off places. Its centenary year opens in the number of January, 1923, in which are published communications from London, the British medical centers, Edinburgh, Vienna, Tokyo, Paris, New York, Philadelphia, Cape Town, Stockholm, Zurich, Madras, Bukharest and Berlin. The *Lancet*, then has symbolized adequately throughout its existence mainly on account of its age, but also because of its able editorial conduct, the advance of medical journalism

during the past 100 years. While moving with the time it is more conservative than American medical journals. However, this is in keeping with the manners, customs, and tastes of their respective readers. A study of the *Lancet* from its earliest days provides an engrossing retrospect of the ups and downs of medical science and its practitioners during the period covered, and the progress of medicine towards the light. At the same time, it exhibits the advance of medical journalism or rather is a mirror of its advance in all civilized countries."

Insurance statistics are throwing much light on the question of the relation of weight to mortality, we are informed by a writer in a recent issue of the *Statistical Bulletin* of the Metropolitan Life Insurance Co. It is generally recognized that the weight of the human body in relation to its height plays a part in determining the health and longevity of the individual. It is only recently, however, that the long experience of the insurance companies has made possible the crystallization of this impression into a series of definite conclusions. Concerning this matter the writer says:

"We know now, for example, that overweight is a serious impairment among insured lives, the gravity increasing with the excess in weight over the average for the height and age. But even this statement has its exceptions because, at the younger ages, a limited amount of overweight is apparently an advantage. Such persons have uniformly a lower death rate from tuberculosis. It is after age 35 that overweight, even in relatively small amounts, begins to be dangerous. The seriousness increases with advancing age and with the amount of overweight.

"Among short men, that is, those below 5 feet 7 inches in height, at the age period 40 to 44 years, an excess of 20 per cent in weight involves an added mortality of 30 per cent above the normal. A 40 per cent increase in weight in such individuals involves an increased mortality of nearly 80 per cent. Among tall men, that is, those over 5 feet 10 inches in height, the adverse situation is even more marked. For, among them, at ages 40 to 44, a 20 per cent excess in weight carries a 40 per cent increase in mortality, and a 40 per cent excess in weight doubles the mortality.

"On the other hand, underweight, which is common enough, presents a different picture. In general, underweight is an advantage, provided, of course, the proportion is not too great. It is a serious impairment in early adult life, especially among taller men. Those who are over 5 feet 10 inches, and who are 20 per cent below the average weight for their height, show an increased mortality of 30 per cent. Those having 30 per cent underweight have a 50 per

cent excess mortality at these early ages. But, from age 40 onward, there are apparently no such penalties for underweight and this condition, in fact, becomes a distinct advantage; for these are the people who have the best mortality rates.

"The important lesson taught by these propositions is that there is an optimum build with reference to mortality. The average build is not the best build. Those who weigh between 10 and 20 per cent below the average show the optimum condition of longevity at the most of the ages after early adult life. These few facts which have been derived from analysis of the insurance records must be supplemented by intensive physiological research. A promising field of investigation is opened up for the physiologist to determine why the body mechanisms function better in those who are of lighter build than in heavier set persons. Common observation confirms these statistical findings. We can all recall from our personal observation that the large majority of our friends who have reached a ripe old age are of slight build. Large persons more often succumb at an earlier age to the diseases of the heart or kidneys, to pneumonia, and to disorders which reflect the worn-out machinery of the body. To discover the reason for this is the problem of the physiologist.

"A promising lead for investigation is the suggestion that among overweights having a large chest capacity the conditions of mortality are more favorable than among those not so protected. It may well be that overweights who have large trunks are probably the best overweights and must be distinguished from those of small chest capacity and correspondingly large abdominal girth. The significance of these differences is for the future to determine."

In the Tropical Diseases' Bulletin there have recently appeared several useful reviews of recent work in connection with certain subjects. Plague is dealt with in the number for August, 1922, by Col. Tull Walsh, I. M. S. (retired). Several points of interest occur in the review.

Various animals besides the rat have been found to be reservoirs of the disease—ground squirrels in California, marmots in North China, the gerbil and a mouse in South Africa. The work of Bacot and Martin in 1914 is pretty well generally known in the medical world by this time, and it is now generally accepted that infection from the flea to man is conveyed, not by the patient scratching the bite, but by regurgitation of the infected gastric contents of the flea. This happens whilst the insect is attempting to overcome the obstruction caused by a plug of clotted blood swarming with bacilli in the proventriculus.

The most interesting recent work on the rat flea is that of Major Cragg. He finds that the prevailing flea in those parts of India which are liable to severe plague epidemics is the *Xenopsylla cheopis*. In places like Burma which have never been visited by plague the prevailing kind is *X. astia*, which does not bite man so readily as does *X. cheopis*.

Stress is laid on the difficulty of diagnosing pneumonic plague, especially if other forms of pneumonia are occurring in the place at the same time. The most significant points are the rapidity with which the fatal result follows, the insignificance of the physical signs at the beginning, and the occurrence of a watery sputum instead of a viscid sputum; also the fact that the sputum is very bloody.

Whilst in ordinary rat plague the site of infection is usually in the legs, so that the groin glands are involved, it is noticed that the axillary and cervical glands are the ones most commonly involved in plague occurring amongst people engaged in skinning infected marmots and squirrels. The mortality in these cases is higher than in the cases arising from rat infection.

There is increasing evidence of the value of antiplague serum in the treatment of the disease and also of the value of inoculation with antiplague vaccine in the prevention of the disease.

Dr. Sofie A. Nordhoff-Jung, of Washington, D. C., United States of America has founded an annual prize of \$500 bearing the title of "The Sofie A. Nordhoff-Jung cancer research prize." This prize is destined for the encouragement of researches in the etiology, prevention, and treatment of cancer. It will be awarded by a commission, composed of members of the University of Munich, Bavaria, and be granted for the first time in December of the year 1923. The commission consists of Profs. Borst, Doederlein, and Sauerbruch, with Professor von Romberg as chairman. This body is empowered to elect successors. The award will be made as a recognition of the most conspicuous work in the world literature bearing on cancer research, done at a time antecedent to the allotment of the award. Though the prize will not be awarded on a competitive basis the commission invites all research workers in cancer to submit literature on this subject.

"The Great Imitator" is a title which has been aptly applied to syphilis, for there is scarcely a pathologic entity which may not be simulated by this disease. The reason for this is more apparent when two of the several characteristics of the *treponema pallidum* are remembered—its ability to invade any tissue of the body, and

its tendency to excite a subacute or chronic, often an indolent inflammatory process wherever it colonizes. Just as syphilis is no respecter of persons, so also it is no respecter of the tissues which it invades, and often it lays its wanton touch where it is least expected. This is in marked contrast to most other pathogenic organisms, as for example the tubercle bacillus, typhoid bacillus, gonococcus, and others which seem to have a predilection for certain tissues. The observable general effects of inflammation are practically the same, regardless of the etiologic agent. And because the *treponema pallidum* is a vagrant, roaming at large in the body, it frequently happens that the symptoms to which it gives rise are remarkably like those due to other microorganisms.

The diagnosis of syphilis should offer no insurmountable obstacles to the general practitioner, however, for with a careful history, a thorough and exhaustive physical examination, and the blood Wassermann test, a correct diagnosis is generally assured. Even apparently well-defined symptom complexes may frequently lead to a wrong diagnosis unless syphilis, the great imitator, is constantly kept in mind. The following brief series of abstracts of papers which have appeared in current medical publications calls attention to some of the ways in which syphilis may imitate certain of the well-recognized conditions which are due to causes other than syphilis.

*Syphilitic Backache*¹.—Backache presents a common and frequently one of the most difficult problems arising in the course of the day's work of the physician. Among the many causes for this complaint, syphilis has received but little attention.

Syphilitic involvement of bone tissue is not uncommon and is generally recognized, but when syphilis attacks the vertebral column it is too frequently overlooked. The usual sites involved are the cervical and lumbar region. Pain is usually the chief symptom. It may come on suddenly or gradually, extending over a long period of time and manifesting itself by a general soreness. The most characteristic feature of the condition is that the pain, although quite constant, is invariably intensified at night. Local tenderness is marked and increased by percussion over the affected area. There are also limitation of motion and hypertonicity of the muscles. Given a case with the combination of a stiff back and restricted mobility, one is justified in suspecting syphilis as the underlying cause.

The pathology is similar to syphilis of the bone found elsewhere in the body. It may be a simple periostitis or an osteitis or a combination of both. The tendency is to form new bone and the nodules thus formed press on the nerve roots and cause pain.

¹ Warren Thompson, M. D., American Journal of the Medical Sciences, Vol. CLXIV. No. 1, July, 1922.

The diagnosis of syphilitic backache necessitates the careful exclusion of all other possible factors producing backache. Special attention should be directed to several conditions with which it is particularly liable to be confused, namely, osteoarthritis from focal infection tuberculosis, metastatic invasion of the spine from malignant tumors, and typhoid spine. Infective arthritis usually involves many vertebræ, whereas syphilitic spondylitis is characterized by the involvement of a limited number of vertebræ. Tuberculosis is particularly likely to cause confusion. In one series of 70 cases of supposedly tuberculosis spondylitis in the Foundling Hospital in London, 7 per cent showed positive Wassermann reactions and cleared up under antiluetic treatment. One writer gives syphilis as the cause of backache in 50 per cent of the conditions which have heretofore been ascribed to tuberculosis. A careful search for syphilis elsewhere in the body is of the utmost importance.

Syphilis of the bone responds readily to antiluetic treatment, the pain disappears readily and the bony deposits rapidly absorb.

The prognosis in backache resulting from syphilitic spondylitis is excellent.

Consider syphilis as a possibility in all cases of indefinite backache and make use of all means of diagnosis, X-ray, Wassermann examination, and therapeutic tests.

*Syphilis and high blood pressure.*²—The adage that "a man is as old as his arteries" can be said to be true almost without exception. Arteriosclerosis and high blood pressure are not so constant as to cause and effect as has been formerly believed. A considerable degree of high blood pressure usually exists for an appreciable length of time without causing any permanent thickening of the blood vessel walls. Conversely, a considerable degree of arterial thickening can exist without a corresponding increase in the blood pressure. In old age there is found a fibrous transformation of the muscle and elastic fibers of the two inner coats which gives rise to the rigidity of the arterial tubes which may be regarded as a natural retrogressive change concomitant with advancing years. However, when due to old age the thickening of the intima is never as pronounced as the thickening of the media and adventitia. It is the undue and premature thickening of the intima which gives rise to the syndrome of high blood pressure.

Changes in the adrenals are also believed to be important factors in the production of high blood pressure. The sclerosis of senility and that caused by other pathological conditions are both of slow development and both are due to irritation, but in the cases where

² Burton P. Thom, M. D., Medical Record, Vol. CI, No. 3, January, 1922.

some demonstrable irritant, such as syphilis, is in the blood stream the period of development is much shorter.

Syphilis attacks the three coats of the arteries, adventitia, media, and intima. It also attacks, and at times obliterates, the vasa vasorum. It is thought that the spirocheta advances by way of these nutrient vessels and that the irritation set up by them causes a proliferation and a round cell infiltration. The thickening of the intima, which is so characteristic of syphilitic arteriosclerosis, is due to the irritation of the infecting organisms as they invade the minute lymphatics which supply the vessels contiguous to and continuous with them. It has been shown that the spirochetæ have a predilection for the walls of the arteries where they lodge and induce pathological changes. It is generally known that spirochetal infection is local for only a very short time. Syphilis is constitutional as soon as the chancre is diagnosticable.

It is generally conceded among syphilologists and clinicians that hemiplegia occurring in patients under 40 years of age is in the majority of instances of syphilitic origin. Even hemiplegia occurring late in life is very frequently preceded by a remote syphilitic infection.

Has the syphilitic factor in cardiovascular diseases been sufficiently recognized? Doctor Thom is of the opinion that syphilis is the most frequent cause of the syndrome of high blood pressure.

*Syphilitic and tuberculous joints.*²—The similarity between tuberculous joint disease and that due to congenital syphilis is very close. The idea is prevalent among physicians, however, that nearly all chronic articular infections are tuberculous. Syphilis, as the underlying cause, rarely enters into the consideration of the condition unless the signs of a luetic taint are frankly in evidence. Such common neglect in the diagnosis of bone syphilis brought forth the following sarcastic statement from Fournier: "Everything which in a child or adolescent affects a bone, with the sole exception of traumatism, is ipso facto attributed to scrofula." If we substitute the word "tuberculosis" for "scrofula," the statement is still pertinent to-day.

The reason for this attitude on the part of the physician is often due to his lack of complete understanding of the pathology of syphilis, thereby causing faulty interpretations and wrong conclusions.

Both syphilis and tuberculosis present symptoms of articular irritation, and with it goes muscular spasm: Nature's way of splinting a part. In both instances there will be found enlargement with effusion, and the formation of pus which is sterile on culture. Sensitiveness will be found in both conditions, also a limp when a weight-bearing joint is involved. In either instance there will be alteration

² P. W. Roberts, M. D., *American Journal of Syphilis*, Vol. IV, No. 2, April, 1920.

of attitude if the vertebrae are involved. These manifestations indicate a pathological process, but there is nothing in them to suggest the nature of the infection.

The X ray in these cases will show bone changes, but usually there are no definite characteristics upon which to base a diagnosis. The Wassermann test is frequently negative. In the majority of cases it will be possible to obtain evidences of ancestral infection, or to find additional stigmata of an inherited taint.

*"Chronic articular lesions due to invasion by either tubercle bacilli or treponema pallida produce the same clinical picture. To pronounce a diagnosis of joint tuberculosis without eliminating syphilis * * * is to jeopardize the welfare of the patient."*

*Syphilis and its visceral manifestations.*⁴—It is easy to forget, unless we keep it constantly in mind, that syphilis, especially in its later stages, is prone to affect the viscera. The lesions produced in these organs, and the functional disturbances evoked, may so closely resemble those found in other diseases that only a thorough knowledge of all of the branches of clinical medicine will prevent us from going astray. Syphilis should always be considered in our differential diagnoses involving diseases of the viscera. The visceropathies of early syphilis give rise to few subjective symptoms, although spirochetes may be present in every viscera.

Syphilis plays an important rôle in diseases of the heart and blood vessels, spleen, stomach, liver, and kidneys, and it is often overlooked, because the signs and symptoms as given in the textbooks are so poorly defined and because of lack of thorough physical and laboratory examinations. The cardio-vascular apparatus bears the brunt of the attack of the spirocheta. Aortitis, aortic aneurysm and insufficiency, and involvement of the coronary arteries are especially characteristic of a syphilitic infection.

Syphilis of the stomach is more common than is usually supposed. Ten per cent of gastric ulcers have been claimed to be due to syphilis, gastric crises due to tabes have been operated upon for appendicitis or gallstones, and syphilitic infection of the liver has led to laparotomies for suspected cholecystitis. In all cases of suspected visceral carcinoma syphilis should be ruled out. Syphilis should be carefully considered in all cases of rectal disease, as fistula in ano, ischio-rectal abscess and ulceration about the rectum, which have been repeatedly operated upon with bad results. Stricture of the rectum is almost invariably due to syphilis. Relaxation of the anal sphincter is said to be an early sign in syphilis of the central nervous system. The spirocheta rarely invades the kidneys in early syphilis, but in the chronic interstitial nephritis of late syphilis vascular changes are found which are a part of the general syphilitic vascular sclerosis.

⁴ L.M. B. Cowen, M. D., American Medicine, Vol. XXVIII, No. 6, June 1922.

The infinite variety of the manifestations of syphilis always afford us a constant source of interest. Syphilis is an important factor in the diagnosis of visceral lesions.

Last year a certain patient received orthopedic and physiotherapeutic treatment in several hospitals for a condition regarded as ordinary flat foot. His chief complaint was a continual pain in both heels and legs and pain in the back and hips. After several months of treatment for flat foot a neurological observation was made, which suggested that the condition of pes planus was merely a symptomatic expression of tabes, brought about by the state of hypotonus of the muscular system and its ligaments. The principal neurological findings in the case and relevant abstracts from literature have been prepared as follows by Dr. Paul E. Bowers, regional consultant, United States Public Health Service, Los Angeles, Calif., and indicates the great value of looking out for the earmarks of neurosyphilis. Because of the number of old syphilitics encountered in the Navy, such a summary of the main points in the diagnosis of tabes as Doctor Bowers has given may be read with profit by all.

NEUROLOGICAL EXAMINATION.

1. *Pupils*.—Irregular in outline; unequal in size. Left larger than right. Both respond slowly to light.

“Pupillary reflexes: Here a striking phenomenon is observed. Patients with tabes—as with many other syphilitic affections of the medullary or midbrain region—show a diminution or loss of the pupillary light reflexes, without any loss of the reflex of convergence or of accommodation. This is the Argyll-Robertson phenomenon. It is present in over 60 per cent of the cases, and may be present for many years without other symptoms. The pupils are apt to be at first irregular in size, and also not infrequently in shape. The light reaction is at first less prompt—usually in one eye before the other—later both eyes are involved. Myosis in marked degree is then apt to develop. Loss of the consensual light reflex is one of the earliest signs of this pupillary change (Weiler). The sympathetic dilatation of the pupil is also soon diminished or lost.” (Jelliffe and White, *Diseases of the Nervous System*.)

“Reflex pupillary rigidity is always the evidence of organic nervous disease, most frequently tabes or paresis. * * * An important premonitory symptom of pupillary rigidity one often sees extending over a considerable time is pupillary sluggishness, unilateral and bilateral, when the eye is subjected to light. * * * Inequality of pupils exceeding one-half millimeter may now and then

be seen in health. It is transient in migraine, neurasthenia, and catatonia, and may be permanently present in paresis, tabes, etc. Angular or distorted pupils are observed in paresis, tabes, and brain syphilis." (Wimmer-Hoisholt.)

"The pupils are affected in a great majority of tabetic cases and furnish some of the earliest and most important diagnostic signs. * * * Every possible pupillary modification may be encountered in tabes—inequality, irregularity, miosis, mydriases, sluggishness, loss of light reflex, loss of accommodation reflex, loss of reflex to pain, and absolute iridoplegia. There is only one other disease that has a parallel in this matter of pupillary disturbance, and that is parietic dementia. These various pupillary disorders may be combined in any and every way. Sluggishness of the pupils to light and slight inequalities and irregularities are usually encountered very early in the disease. Over 70 per cent of tabetics show pupillary disturbance. * * * The optic nerve degenerates in about 10 per cent of tabetics, and this occurs in those patients who have shown ocular palsies more frequently than others." (Church-Peterson.)

"Pupillary changes: Pronounced pupillary changes may often, for years, be the only obstrusive evidence of serious central involvement." (Harry C. Solomon and Joseph Klauder, University of Pennsylvania, Journal of the American Medical Association, issue of November 26, 1921.)

"It is important in this connection to bear in mind that the loss of the light reflex is a symptom which in all probability makes its appearance gradually. In examining the eye, a difference in the promptness and general character of the light reaction and the reactions to accommodation should always be noted. A striking contrast between the two reactions, such as a slight, slow, or sluggish light reflex and a prompt reaction to accommodation, possesses an unmistakable significance. * * * Irregularity or deformity of the pupil is found quite commonly in tabes, as in paresis and syphilis. * * * Inequality of the pupils should, even if slight, be regarded with suspicion, especially if one of the pupils reacts sluggishly to light and shows impairment of the light reflex, no matter how slight." (Posey and Spiller.)

Spiller quotes in several pages devoted to pupillary reflexes the statements of many authorities showing that irregularity of the pupil, unequal pupils, sluggish, slight reactions, and Argyll-Robertson pupil are practically constant in tabes.

"Inequality of the pupils is always pathological." (Duane-Fuchs, Textbook on Ophthalmology.)

2. *Elbow and wrist jerks.*—Much increased.

3. *Patellar reflexes.*—Absent. Jendrassik reinforcement used.

4. *Tendo-Achilles reflexes.*—Absent.

"The patellar reflexes (knee jerks) should not, practically speaking, vary during health, and ankle jerks are almost constantly present, even in infants. Absence of tendon reflexes (areflexia) in the lower extremities is therefore as good as always, due to an organic nervous disease, but temporary areflexia may be found in coma, epileptic convulsions, in recent apoplexies, in recent cases of total transverse lesions of the spinal cord (caused by trauma or hemorrhage) located above the reflex centers. Prolonged areflexia is seen in (a) lesions of the reflex arc involving the posterior roots in tabes; * * *." (Wimmer-Hoisholt.)

"Westphal first emphasized the importance of the diminution or loss of the tendon reflexes—notably of the knee jerk and the Achilles reflex. These belong among the initial symptoms in the larger number of cases. The knee jerk may be first diminished on one side, best demonstratable by the Jendrassik method, or lost, and this for years, perhaps, before the development of a complete Westphal phenomenon. The Achilles jerk is lost in a similar manner and not infrequently even after the loss of the knee jerk (Babinski method). These tendon-reflex changes are all referable to the degenerations in the root zones and sensory columns." (Jelliffe & White.)

"The knee jerks are lessened, unequal, or more frequently abolished, and that at an early stage of tabes, in at least 19 out of 20 cases. The lost knee reflex, often called Westphal sign, must be sought with great care. It may also be well to recall that it may be diminished in advanced age, in sleep, by fatigue or exhausting illness or any condition such as a peripheral neuritis. It is also possible that very rarely a healthy adult may be without a knee jerk." (Church and Peterson.)

"The Achilles reflex ordinarily fails with the knee jerk; in fact, it may disappear before the knee jerk is lost and constitutes a valuable early test." (Church and Peterson.)

5. *Coordination tests.*—F-F test and F-N test fairly well done with eyes open. KH test poorly done with eyes open. All tests poorly done with eyes shut. Some ataxia of the upper extremities. Overshoots the mark. On standing at attention with eyes shut there was a slight swaying of the body. Some unsteadiness when walking forward and backward with eyes shut. Heels strike the floor first. Shoes are worn on the toe in the customary tabetic manner. At a later examination the F-F test and F-N test fairly well done with eyes open. K-H test poorly done with eyes open. F-F test and F-N test fairly well done with eyes shut. K-H test poorly done with eyes shut. Patient grasped the table to keep from falling. On doing these tests there was occasionally a little overshooting of the mark. There was a slight

swaying of the body on standing at attention with eyes shut. On doing the about face with eyes open the test was fairly well done. On doing an about face with eyes shut the movements were clumsy but the patient managed to keep his balance, though there was considerable jerking of the head and muscles of the chest in maintaining equilibrium. When the patient walked down the hospital corridor unobserved his feet struck the floor heels first. The patient looks down constantly. Patient has learned something of the tests for locomotor ataxia and is keenly interested in his diagnosis. He has done these tests so often in the last month that he does them much better than formerly. At the time of this examination patient was put at ease and allowed to rest between tests, so that he might perform them in the best possible manner. Patient verbally appreciated the efforts that were made to have him do the tests in the best possible manner.

6. *Motor speech*.—No defect.

7. *Handwriting*.—Slightly tremulous.

8. *Subjective sensations*.—Feet go to sleep easily; feel as if they were lost in bed. Patient denies sharp shooting pains in legs. Denies formications. Denies headaches but admits he has more or less constant pain in feet and occasional attacks of pain in hip and lumbar region of spine. Pain in feet and legs during day and also at night. Recurrent in damp weather.

"Then his 'rheumatic pains,' his 'gouty pains,' his neuralgic attacks, his bilious attacks, take their proper place. At that time a search of the cutaneous sensibility usually reveals its impairment in the feet and legs. The knee jerks are absent, the pupils sluggish or inactive to light, and the ataxia can be demonstrated by the usual test. In certain benign cases the disease never progresses beyond this point. * * * If the knee jerks are gone or very unequal or even greatly reduced, it should add to the suspicion of tabes. In early cases the condition of the heel jerks is often of significance, as they tend to disappear often before the knee jerks are affected. If, now, the Robertson pupil is detected or even sluggishness of the pupil to light is fairly made out, the diagnosis may be considered established." (Church and Peterson.)

"Symptoms in tabes: Lancinating pains, 348 times out of 400 cases. Feelings of weakness in the legs, 191 times out of 400 cases. (From Limbach and Erb.)

"The plantar arches usually yield, and flat foot is the rule in tabes. * * * The ends of the bones and joint surfaces may be either eroded, as is most usual, and greatly reduced in all dimensions." (Church and Peterson.)

"Lancinating neuralgic pains, mostly in the lower extremities, usually precede all other symptoms, pains usually in the sciatic and

crural distributions which they [the patients] speak of, and unfortunately are regarded by physicians even, as rheumatic. These pains come on in attacks and last a few minutes or more, several hours, a few days, and then disappear, to recur again. The distribution is predominantly sciatic or crural and radicular at first. Deep, boring pains are also present, usually later." (Jelliffe and White.)

9. *Sphincteric control*.—Good.

10. *Epicritic and protopathic sensibilities*.—Not impaired.

11. *Locomotion*.—Somewhat impaired. Bumps into things. Reels about. Looks at floor constantly while walking. Pronates his feet; turns them outward. The somewhat reeling and disturbed gait may be due to defensive effort to avoid pain in heels. Gait shows slight straddling and uncertainty with eyes open and shut. The gait is unsteady and uncertain.

"In the early stages (of tabes) the patient notes a difficulty in going up and down stairs, or finds himself insecure on uneven surfaces. He stumbles and at times falls. At night he finds it more difficult to get about and he soon notices that he must keep his eyes glued to his legs or the surface upon which he is walking. Later he must walk with canes, his legs are thrown somewhat wider apart, are thrown somewhat irregularly forward, and are then brought to the ground with a sharp stamp. The manner of rising from a chair or sitting down becomes characteristic. Oppenheim has called attention to the spontaneous movements which closely resemble the static ataxia that are found throughout the body. Other muscles may be involved in ataxia, particularly the muscles of the face, mouth, and tongue." (Jelliffe and White.)

"Walking backward with eyes closed will almost invariably determine incoordination in extremities if present in the slightest degree. So will attempts to stand on one foot. In crossing one knee over the other the moving leg is raised too high and vigorously dropped on its fellow. The legs are thrown out widely, patient goes forward irregularly with some rigidity, toe up, often departing laterally from the direct line, and is brought down with a shock upon the heel or flat foot." (Church and Peterson.)

"The patient [with tabes] walks unsteadily, places his feet on the ground with unnecessary vehemence, knocks his heels on the floor, lifts the swinging leg needlessly high, carries it with a flinging movement, is unable to walk a straight line on the floor, tries to control his walk with his eyes. When the disturbances in gait are slight, the ataxia is sometimes most apparent when the patient is to turn around quickly. He then reels and has to step heavily about. The gait is still more defective with eyes closed." (Wimmer-Hoisholt.)

12. *Thermal sense*.—Not defective.

13. *Stereognostic sense*.—Not impaired. No apraxia.

14. *Cranial nerves*.—No defect.

15. *Gastric pains and crises*.—Since admission to hospital patient has, in addition to pains in legs and feet, complained of pain in the abdomen, in the region of the stomach, of anorexia, constipation, marked attacks of gastric disturbance and vomiting. Patient stated that vomiting occurred after each meal and that it would cease for a few days and then recur without apparent cause and leave off as abruptly as it started.

“Gastric crises in tabes are very common. They are characterized essentially by pains and vomiting. The pains are located in the pit of the stomach and radiate in various directions. The vomiting is repeated and intractable. Sometimes it is attended by excessive straining and again the gastric contents are ejected with very slight eructative efforts. The vomitus at first consists of undigested food and then of gastric mucus in large amounts and finally bilious mucus in the protracted attacks. The vomiting is frequently repeated and only a small amount being ejected at a time after first efforts. The slightest injection of food or liquid of any sort promptly provokes a repetition of the emesis. Gastric crises like all of the critical manifestations of tabes, are of sudden onset and abrupt termination. They may last an hour or two, or several days or weeks without intermission. * * * Suddenly the patient may feel hungry, the pains may abruptly cease, and both food and drink may be taken freely without further disturbance.” (Church and Peterson.)

“The [tabetic] patients have sudden violent gastric pain radiating in all directions, and in severe attacks accompanied by nausea, vomiting, and great prostration. Like the pain attacks, these crises may last for hours or a few days and then disappear for weeks or months to recur at irregular intervals. They disappear as rapidly as they come, and quite analogous to the lancinating pains, may be early or late symptoms.” (Jelliffe and White.)

“The tabetic crises consist of paroxysmal pains radiating in all directions in the region of the epigastrium where one often finds segmentary sensory disturbances. They sometimes lead to prolonged vomiting and dangerous emaciation.” (Wimmer-Hoisholt.)

16. *Spinal fluid examination*.—Refused by patient, who stated later that he had an examination made by a private physician, who reported it negative.

“Wassermann reaction, positive in about 70 per cent of cases [tabetic], negative in 30 per cent of cases.” (Wimmer-Hoisholt.)

“The Wassermann reaction of the blood serum is positive in most cases of tabes. The cerebrospinal fluid is positive in from 60 to 80 per cent.” (Jelliffe and White.)

"The blood Wassermann test may or may not be positive in this instance [tabes]. It is these cases which require the fine clinical examination by one who has a thorough and fundamental knowledge of neurology, before the diagnosis of nerve syphilis can be made without confirmatory laboratory findings." (Harry C. Solomon and Joseph Klauder, University of Pennsylvania, Journal of the American Medical Association, issue of November 26, 1921.)

"It is generally recognized that active visceral and skin syphilis may exist in the absence of syphilitic inhibition of hemolysis in the Wassermann test. The same is true of syphilis of the nervous system. There are a group of cases in which even the presence of an active, progressive, and pathological process, the test on the spinal fluid will be essentially negative. * * * It would follow that one must consider the clinical facts in order to make a diagnosis without depending entirely on a laboratory examination of the fluid. * * * Much has been written of the abortive and burnt-out tabes which are cases in which the spinal fluid is normal although the objective signs of tabes exist. * * * McIntosh, Fildes, Head, and Fernside have asserted that pure cerebral syphilis—that is, syphilis of the cerebrum, without spinal cord involvement, frequently, if not almost invariably, gives negative fluid findings, or that at any rate the spinal fluid changes would be minimal in intensity. * * * The statistics of Dreyfus are of importance in the discussion. According to the observations of this writer from 35 to 40 per cent of tertiary syphilitics with isolated pupillary abnormalities have negative spinal fluids. Indeed, in Dreyfus's series of cases the spinal fluid remained negative after provocative arsphenamine injections. * * * Our conviction, which we hope we have shown is based on facts, is that there are many instances of active cerebral syphilis and even spinal syphilis in which the spinal fluid reactions are negative, but yet the patients are actively syphilitic and react favorably to antisyphilitic treatment. The following cases can be presented as final evidence in our chain that negative spinal fluids do not in any respect indicate the lack of activity of syphilis in the nervous system." (Harry C. Solomon and Joseph Klauder, University of Pennsylvania, Journal of the American Medical Association, issue of November 26, 1921.)

"Miller, of Johns Hopkins, gives the following table as showing the average frequency of the various reactions of syphilis of the central nervous system:

"Blood Wassermann in tabes dorsalis, 70 per cent positive, 30 per cent negative.

"Pleocytosis in tabes dorsalis, present in 87 to 90 per cent of the cases, absent in 15 to 10 per cent.

"Cerebrospinal fluid, Wassermann positive in 60 to 80 per cent of the cases, negative in 40 to 20 per cent.

"Positive globulin test in 90 to 95 per cent of the cases of tabes dorsalis, negative in 10 to 5 per cent.

"Colloidal gold test in tabes dorsalis, 85 to 90 per cent positive. 15 to 10 per cent negative." (Stitt, Practical Bacteriology, etc.)

"Nonne states that the spinal fluid may be negative in neurosyphilitic cases. * * * Those cases of nerve syphilis which are active despite the negative and spinal fluid require and are entitled to active antisyphilitic remedies. * * * There are, however, cases in which mental peculiarities occur in syphilitics who show definite evidence of central nervous system syphilis, such as the Argyll-Robertson pupil, and who have negative spinal fluids. * * * There are a group of cases with definite subjective symptoms, with evidence of central nervous system syphilis, as shown by the physical signs, but with negative spinal fluid." (Harry C. Solomon and Joseph Klauder, University of Pennsylvania, Journal of the American Medical Association, issue of November 26, 1921.)

"The clinical signs and symptoms of tabes may occur with a negative blood and spinal fluid." (Fordyce and Rosen, Journal of the American Medical Association, issue of November 26, 1921.)

DIAGNOSIS.

In this case we have a patient who has had trouble with his feet since 1918, and according to his statement he has been treated by orthopedic methods for more than a year without permanent relief. He did receive temporary relief because his feet were put at rest by plaster casts and rest in bed. His pain still continues.

Patient denies that he has ever had syphilis, but does admit that he has had gonorrhea. The following facts of his history are significant. The glandular system is not normal; the cervical, epitrochlear, and inguinal glands are palpable. There is a large, distinct, well-defined scar on the genitals and old scars on various portions of the body the presence of which is inadequately explained as being the result of a crop of boils. Patient admits exposure to venereal disease.

There is no clinical or laboratory evidence of lead or arsenical poisoning in the history of the case.

The ensemble of facts conclusively proves the presence of the pre-ataxic stage of tabes dorsalis.

1. Scar on shaft of penis.
2. Scars on various portions of the body accounted for as boils.
3. Irregular pupils.
4. Unequal pupils.
5. Sluggish reaction of pupils to light.
6. Absence of patellar reflexes.
7. Absence of tendo-Achilles reflexes.

8. Faulty performance of knee-heel test with eyes shut.
9. Unsteadiness and jerking of the body and head in the performance of all coordination tests with eyes shut.
10. Unsteady, stamping gait (in going about the hospital).
11. Pronation of feet.
12. Straddling gait when not observed and when not making an effort to overcome locomotion defect.
13. More or less constant dull pain in legs and feet.
14. Paroxysms at irregular intervals of pain in feet.
15. Frequent attacks of vomiting and gastric pain, without relation to diet.
16. Attacks of pain which are sufficient to put patient to bed during the day time, which are not the result of walking or exertion.

A negative Wassermann of the blood does not rule out tabes dorsalis, as 30 per cent of tabetics may have a negative Wassermann of the blood, as stated by various authorities that have been quoted.

One examination of the spinal fluid, said to be negative and without increased cell count, does not rule out tabes dorsalis, for tabes, paresis, and other forms of nerve syphilis may exist with a negative spinal fluid, as stated by well-known authorities.

Pain in limbs and feet form a part of the clinical picture of tabes dorsalis, as stated by authorities Church and Peterson. Flat foot does not produce the constant pains in legs and feet, whether the patient exercises or not, nor do they account for the paroxysms that occur in the feet and legs.

Gastric crises and persistent vomiting which come on abruptly and disappear in the same manner are characteristic of tabes.

Bony proliferation, as shown by the X ray of patient's feet, is in harmony with the statements of authorities that bony proliferation and erosions are common in tabes, due to trophic changes.

Normal fundi occur in about 90 per cent of tabetics in the early stage.

Periods of irritability and outbreaks of temper occur with great frequency with this patient, as is common in cases of syphilis of the nervous system.

Blood picture is negative for lead and arsenical poisoning.

From the entire clinic picture the diagnosis of tabes dorsalis, pre-ataxic stage, is justified.

"Little difficulty exists after the development of the Argyll-Robertson pupil, loss of knee jerks, ataxis, and Romberg [in diagnosis of tabes]." (Jelliffe and White.)

"A patient may remain in the preataxic stage for an indefinite period. Loss of the deep reflexes: This early and most important sign may occur years before the development of ataxia. Even

alone it is of great moment, since it is very rare to meet with individuals in whom the knee and ankle jerks are normally absent. The combination of either of these with one or more of the symptoms mentioned above, especially with pains and ptosis or Argyll-Robertson pupil, is practically diagnostic. * * * The initial symptoms may persist for years without the development of inco-ordination." (Osler.)

"If the knee jerks are gone or are very unequal or even greatly reduced, it should add to the suspicion of tabes. In the early cases the condition of the heel jerks is often of significance, as they tend to disappear even before the knee jerks are affected. If, now, the Robertson pupil is detected or even sluggishness of the pupil to light is clearly made out, the diagnosis may be considered established. The detection of several or many of the usual subjective or objective features of this disease will confirm it." (Church and Peterson.)

"Lancinating pains, pupillary changes, absent tendon reflexes, are sufficient to make the diagnosis." (Shaw.)

DIFFERENTIAL DIAGNOSIS.

Congenital absence of tendon reflexes is extremely rare, and all tendon reflexes are not involved at the same time, and the healthy individual with this rare anomaly does not have attendant upon his congenital absence of reflexes pupillary changes, neuralgias, gastric pains, and other crises.

"The steppage gait of arsenical, alcoholic, or diabetic paralysis is quite unlike that of tabes. There is paralysis of the feet, and the legs are lifted high in order that the toes may clear the floor. In diphtheretic paralysis the early loss of the knee jerks and the associated eye symptoms may suggest tabes, but the history of paralysis of the throat and the absence of pains render the diagnosis easy." (Osler.)

Combined sclerosis, cerebellar tumor, insular sclerosis, cerebellar disease, have a distinct and specific grouping of symptoms which is not found in this case, and these diseases are ruled out.

BOOK NOTICES.

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MONTAIGNE AND MEDICINE. Being the Essayist's Comments on contemporary Physic and Physicians; his Thoughts on many material Matters relating to Life and Death; an Account of his bodily Ailments and Peculiarities and of his Travels in Search of Health, by *James Spottiswoode Taylor, Commander, Medical Corps, United States Navy, M. D., F. A. C. S., Member Société Française D'Histoire De La Médecine.* Paul B. Hoeber, New York, 1923.

Michel Eyquem de Montaigne, the great French essayist, usually known simply as Montaigne, was born, as he himself tells us in his famous Essays, on the 28th of February, 1533, in the Chateau de Montaigne, which is located near a little village not far from Bordeaux.

Pierre Eyquem, Montaigne's father, had been engaged in commerce—a herring merchant, says Scaliger; others say he dealt in wine. He had filled several municipal offices in Bordeaux and had served under Francis I in Italy as a soldier. He married Antoinette de Louppes who had descended from a family of Spanish Jews. Montaigne's father appears to have made a hobby of education and devised certain fantastic plans for rearing the youngster. At a very early age the boy was sent to the College de Quienne at Bordeaux, then at the height of its reputation. Later he studied law and, on attaining his majority, he was made a counselor in the Bordeaux Parliament. In 1558 he was present at the siege of Thionville, in 1559 and in 1561 he was in Paris, and in 1562 at the siege of Rouen. He was much about the French court and he admits in his writings that in his youth he had led a life of pleasure. In 1565 he married Francoise de la Chassaigne, whose father was, like himself, a member of the Bordeaux Parliament.

Three years later his father died and he succeeded to the family possessions. In 1571 he retired to the Chateau de Montaigne, his health having been impaired, as some say, by the hard living which was usual at the time, and began to lead a life of study and contemplation. In the tower of the chateau, which he converted into a study, he read, wrote, mediated on the affairs of life, and annotated his books, some of which are still in existence.

Much of the time of his retirement was spent in the preparation of three remarkable books of essays, the first two of which appeared in 1580, when the author was 47 years of age. These two books contain no fewer than 93 essays. The first volume begins with a short address to the reader in which he says that his sole object is to leave for his friends and relatives, a word picture of himself, defects and all. The essays follow and their titles are of the most diverse character. Sometimes they are merely proverbial sayings, sometimes they are headed like the chapters in a book of ethics: "On fear," "On friendship," "Of drunkenness." Sometimes a fact of some sort which has awakened a train of associations in the mind of the writer serves as a title and occasionally the titles appear to be deliberately fantastic. Sometimes, though not very often, the dissertations are not essays but merely entries of singular facts or quotations with hardly any comment. But generally the essay character—that is to say, the discussion of a special point, but often with wide digressions—displays itself. The digressions are constant and the nominal title, even when most strictly observed, is rarely more than a starting point for Montaigne. Quotations from the classics are frequent.

In 1571 Montaigne had received the order of St. Michel; in 1574 he was with the army of the Duke de Montpensier; two years later was made gentleman-in-ordinary to Henry III and the year following to Henry of Navarre. He visited Paris occasionally and traveled for health or pleasure to various portions of France. With the years his health declined, and he was grievously tormented by renal calculi. Because of this affliction he determined to visit the various watering places in Italy which at that time were considered especially beneficial for stone and gravel. Accordingly, in the year 1580, he journeyed to the baths of Lucca. Late in the eighteenth century a journal was found in the Chateau de Montaigne giving an account of this journey; it was published in 1774.

Although this journal has been considered destitute of literary interest, and has rarely been reprinted with the Essays, it possesses much to attract the medical man and the student of the period during which Montaigne lived. The course of the journey was first northward to Plombieres, then to Basel to Augsburg and Munich, then through the Tyrol to Verona and Padua in Italy. Montaigne

visited most of the famous cities of the north and center of Italy, staying five months at Rome, where he had an audience with the Pope and was made a Roman citizen, and finally establishing himself at the baths of Lucca for nearly as long a time. There he received news of his election as mayor of Bordeaux with a peremptory royal indorsement enjoining residence in that city, and after a slight delay he journeyed homeward. The journal of this tour contains much minute information concerning his physical condition, the towns, baths, inns, food, and traveling conditions.

Montaigne was not altogether delighted at his election to the mayoralty, which promised him two years of responsible if not very hard work. The memory of his father, who had occupied the office, and the commands of the King, induced him, however, to accept it; and he seems to have discharged it neither better nor worse than an average magistrate. Indeed, he gave sufficient satisfaction to the citizens to be reelected at the close of his term, and it may be suspected that the honor of the position, which was really one of considerable dignity and importance, was not altogether indifferent to him. He lived during troublesome times but was able, in spite of his ill health, the occupations of his journey, his mayoralty, and the pressure of civil wars and pestilence, to continue his essay writing. His second term of office terminated in 1585. In 1588, after a visit of some length to Paris, the third book of essays was published, together with the former ones considerably revised. The last essays differ strikingly from the older ones in respect to length. They are, however, identical with the earlier ones in spirit, and make with them a harmonious whole—a book which has hardly been second in influence to any in the modern world.

Montaigne is one of the few great writers who have not only perfected but have also invented a literary form. The essay as he gave it had no forerunner in medieval literature and no direct ancestor in the literature of classical times. Beginning, as may be seen in the first book, with the throwing together of a few stray thoughts and quotations linked by a community of subject, the author by degrees acquires more and more certainty of hand until he produces such masterpieces of apparent desultoriness and real unity as the essay "On some verses of Virgil." His vocabulary and style appears to have been influenced by Jacques Amyot, an early translator of Plutarch, and the great French poet Ronsard, who was a contemporary. Although he used many latinized words, he employed provincial expressions with a good deal of freedom, though not as extensively as Rabelais, and it is pleasing to note that after the great literary revolution which swept over France a few years after Montaigne's death, resulting in the establishment of the French Academy, with its minute grammatical censures, only these

two writers of an older date held their ground, and Montaigne was the more generally read of the two.

Like Rabelais, Montaigne thoroughly and completely exhibits the intellectual and moral complexion of his day. When he reached manhood the French Renaissance was at high water and the turn of the tide was beginning. Rabelais, who died when Montaigne was in early manhood, exhibits the earlier and rising spirit. With Montaigne begins the age of disenchantment. By the time, at least when he began to compose his essays in the retirement of his chateau, it was certain that no golden age was to dawn. As the earlier Renaissance had specially occupied itself with the practical business and pleasures of life, so the later Renaissance specially mused on the vanity of this business and these pleasures. The predisposing circumstances which affected Montaigne were thus likely to incline him to scepticism and to ethical musings on the vanity of life, but the reader of Montaigne's Essays will note that he is far too much occupied about all sorts of the minutest details of human life to make it for a moment admissible that he regarded life as a whole lightly.

Although regarded by many as a sceptic, Montaigne in reality is one of the world's greatest humorists. There is hardly any writer in whom the human comedy is treated with such completeness as it is by Montaigne. In the desultory and haphazard fashion which distinguishes him there are few parts of life on which he does not touch. He is always charming, but rarely inspiring, except in a few passages where the sense of vanity possesses him with unusual strength. As a general rule, an agreeable grotesque of the affairs of life occupies him.

Montaigne did not long survive the completion of his book. He died on the 13th of September, 1592, and was buried in Bordeaux. Since his death many generations of men have rejoiced in the gentle irony with which he handles the ludicrous side of life, in the quaint felicity of his selections of examples and in the real though sometimes fantastic wisdom of his comment on his selections, and many commentaries on his observations have been published. But so far as the reviewer is aware no one, until the present instance, has attempted to search out and put into a readable book the great essayist's comments on the physicians and the medical practice of his times, his thoughts on matters relating to everyday life, his bodily ailments and peculiarities, and his travels in search of health. This Doctor Taylor has done in an admirable manner and those unfamiliar with Montaigne, his writings and his times, have a rare treat in store for them in this volume.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

THE RESULTS OF VENEREAL PROPHYLAXIS ON THE U. S. S. "HENDERSON."

By K. E. LOWMAN, Lieutenant, Medical Corps, United States Navy.

From June 1, 1922, to January 3, 1923, every endeavor was made to keep accurate statistics of the number of prophylactic treatments taken by the crew, with an idea of obtaining data relative to its efficacy in the prevention of venereal disease. The data contained in this article were compiled from the venereal disease questionnaires which were given to each man, the prophylactic records kept in the sick bay, and the basic morbidity report—Form F Card. During the time covered by this report the U. S. S. *Henderson* cruised extensively, visiting Norfolk, New York, Charleston, many ports in the West Indies, Colon, Balboa, San Diego, San Pedro, San Francisco, Honolulu, Yokohama, Nagasaki, Shanghai, Manila, and Guam. There was an average of 400 enlisted men on board as passengers and an average of 400 men in the regular crew of the *Henderson*, making an average of approximately 800 men on board. Of course, this number varied from time to time.

All men were carefully instructed by means of lectures, posters, pamphlets, etc., as to the value of early venereal prophylaxis, special emphasis being laid on the importance of the early use of the prophylactic tube furnished by the Bureau of Medicine and Surgery. These lectures were given by the medical officer to divisions, one at a time, and to divisional officers, who in turn, instructed the personnel of their respective divisions. It has been my observation that enlisted men are very attentive during these lectures if the medical officer will talk to them in plain language without mincing words.

The prophylactic tube issued by the Bureau of Medicine and Surgery, and mentioned in this report, contains the following ingredients:

Calomel	33
Camphor	2
Phenol	3
Anhydrous lanolin	39
Benzoinated lard	20
Beeswax	3

Each tube is wrapped with paper upon which are printed full directions for its use. These tubes were issued to the men *ad libitum*. In addition, all men were given the opportunity of taking the routine prophylaxis aboard ship upon return from liberty. The prophylactic treatment used aboard ship was as follows: (a) Thoroughly wash the parts with soap and water; (b) bathe parts carefully in a 1-2,000 bichloride solution; (c) inject a 2 per cent solution of protargol into the urethra and allow to remain therein for five minutes; (d) apply 33 per cent calomel ointment to entire penis, scrotum, and surrounding parts. A careful record of all persons taking treatment was kept in the venereal prophylactic room.

From June 1, 1922, to January 3, 1923, there were 94 cases of venereal disease admitted to the sick list—9 with syphilis, 27 with chancroid, and 58 gonococcus infection.

Of the 9 cases of syphilis, 4 were contracted in Shanghai, 1 in Manila, 2 in Panama, 1 in Japan, and 1 in Santo Domingo. Six of these cases gave a history of having used prophylactic tubes immediately after exposure, four of whom took additional prophylactic treatment aboard ship—two about one hour after exposure and the other two, three or four hours after exposure. In this connection it might be stated, however, that from experience aboard ship it appears that little credence can be given to statements of the men as to their employment of the prophylactic tube. Two of the men who developed syphilis did not use the prophylactic tube, but used the prophylactic treatment aboard ship one and one-half hours after exposure. Only one case stated that he had failed to take prophylactic treatment.

The following table gives the prophylactic record of the 27 cases who developed chancroid:

Used prophylactic tube immediately and took ship's routine prophylaxis	
1 hour after exposure.....	5
Used prophylactic tube only, immediately after exposure.....	8
Used ship's routine prophylaxis—	
1 hour after exposure.....	5
2 hours after exposure.....	2
3 hours after exposure.....	1
4 hours after exposure.....	2
Failed to take prophylaxis.....	4

The following table gives the prophylactic record of the 58 men who developed gonococcus infection:

Used prophylactic tube immediately and took ship's routine prophylaxis	
1 hour after exposure.....	14
Used prophylactic tube immediately and took ship's routine prophylaxis	
2 hours after exposure.....	1
Used prophylactic tube immediately and took ship's routine prophylaxis	
4 hours after exposure.....	1
Used prophylactic tube immediately and took ship's routine prophylaxis	
7 hours after exposure.....	1
Used prophylactic tube only, immediately after exposure.....	15
Used ship's routine prophylaxis—	
1 hour after exposure.....	4
2 hours after exposure.....	4
3 hours after exposure.....	4
4 hours after exposure.....	3
5 hours after exposure.....	2
8 hours after exposure.....	1
Failed to take prophylaxis.....	8

Thirty-five of the 94 cases of venereal disease stated that they had previously had gonorrhea, chancroid, or syphilis; or, in other words, 37 per cent of the group had previously had venereal disease. Sixty-nine of the 94 cases were contracted in the Far East, 5 in Panama, and the remaining in the United States and the West Indies. Although the ship was in Shanghai for only nine days, 31 cases of venereal disease were contracted there. The next highest number of cases were contracted in Japan; that is, 19 within a period of 14 days. Sixteen cases were contracted in Manila, where the ship remained only five days; and three cases are definitely traceable to Honolulu where the ship remained only five days. From the records it appears that approximately 75 per cent of the men who were infected had been drinking intoxicants to a greater or lesser extent, and carelessness in the use of the prophylactic tube (when this alone was employed) may be blamed directly upon the effects of alcoholic stimulation. For if "three drinks makes the peasant lose respect for the king," what respect for the prophylactic tube's efficacy can we attribute to a man who is in the later stages of intoxication?

Approximately 29,136 liberties were granted from the U. S. S. *Henderson* from June 1, 1922, to January 3, 1923. Of this number, 1,226 men took prophylaxis aboard ship or used the prophylactic tube. Forty-two per cent of the 1,226 men used both tube and ship's routine prophylaxis, and the remaining 58 per cent employed only routine prophylaxis aboard ship. Six and fifty-six hundredths per cent of the total number of men who took prophylaxis developed venereal disease. Of the 1,226 men who used prophylactic treatment, 60 per cent stated that the ship's prophylaxis was employed one hour

after exposure; 20 per cent, two hours after exposure; 10 per cent. three hours after exposure; and the remaining 10 per cent took prophylaxis anywhere from 3 to 12 hours after exposure.

REPORT OF RECENT EPIDEMIC OF INFLUENZA, UNITED STATES NAVAL HOSPITAL, CHELSEA, MASS.

From December 16, 1922, to January 6, 1923, there were 139 cases of influenza admitted to this hospital. These cases were received from the U. S. S. *Florida*, U. S. S. *Utah*, U. S. S. *North Dakota*, U. S. S. *Delaware*, U. S. S. *Birmingham*, U. S. S. *Bridgeport*, and several destroyers.

The disease was epidemic in character. The predominating symptoms were fever, cough, headache, general malaise, and prostration. In the majority of cases white blood counts averaged between 6,000 and 9,000. The differential count was practically normal. While this may not be considered as a leukopenia, the blood counts in those cases, with temperatures varying from 100° to 104°, were relatively low. Bronchitis was present in practically all cases and pharyngitis, laryngitis, and mild sinusitis were present in many. Several complained of sore throats upon admission, but all of the throat cultures were reported as negative. The throats of practically all patients were injected, but none were covered with a membrane or an exudate. Streptococcus, particularly hemolytic streptococcus, was suspected as a causative agent, but none were reported in the laboratory findings. The majority of cases showed a normal temperature, with amelioration of symptoms in 3 to 5 days. Many men complained of weakness after the subsidence of other symptoms.

Out of the 139 cases admitted with influenza, 28 developed pneumonia. The physical signs and the course of the disease were most irregular. Three cases which showed signs of massive consolidation, increased temperature, pulse, and respiration, had normal temperature within 36 to 48 hours, with no evidence of consolidation. All three of these cases showed evidence of severe infection as characterized by prostration and slow convalescence. The remaining 25 cases had physical signs of massive lobar pneumonia, affecting one lobe of the entire lung, or both lungs.

The majority of the cases were X-rayed and, with the exception of one or two cases, the X-ray diagnosis was lobar pneumonia. The leucocyte counts varied between 9,000 and 28,750 with polys between 73 and 90 per cent. As to type—5 were Type I, 2 were Type II, 2 were Type III, 12 were Type IV, and in 7 cases the typing was unsatisfactory. The majority showed marked toxemia as characterized by prolonged delirium, excessive herpes, and loss of flesh.

Out of the 28 cases there was but 1 death. At autopsy the lungs showed complete consolidation of the left lower lobe, central consolidation of the left upper lobe, and partial consolidation of the right lower lobe. Of the series, 5 cases developed middle ear complication, 3 of which went on to suppuration. Three cases had large effusion in the pleural cavity and one interlobar empyema. During convalescence several cases developed an acute follicular tonsillitis. During the same time four Veterans' Bureau patients were admitted.

Three of the nurses on duty in the wards with these patients contracted influenza and were incapacitated for duty for from 7 to 10 days. Symptoms common to all were fever, cough, general malaise, and prostration. Average white counts were 6,000 with normal differential counts. None of these cases developed pneumonia.

Inclement weather prevailed during this epidemic and exposure to wet and cold must be regarded as prominent factors in determining the exciting cause of this epidemic.

There is much confusion to-day as to what constitutes influenza and the name that shall be applied to cases suffering from a combination of symptoms such as existed in this epidemic. It is believed that the pandemic which raged a few years ago has caused many physicians to refrain from the use of the term "influenza" because of the bad effect upon the community. There are others who believe there must be a high mortality, otherwise it is not influenza. Consequently, grippe, catarrhus epidemicus, bad cold, and influenza are used by different individuals as names to represent the same group of symptoms.

It is believed that with the opportunity for wide distribution such as existed during the World War and the presence of virulent secondary invaders, the disease occurring in this epidemic would resemble in every respect the so-called influenza which prevailed so extensively and caused such disaster a few years ago.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

HEALTH CONDITIONS OF THE NAVY.

There has been a slight improvement in health conditions of the Navy during the four-week period ending April 7, 1923; the annual admission rate for this period for all cases, entire Navy, being 740 per 1,000. The greatest improvement has been noted at shore stations. The annual admission rate for injuries for the four-week period ending April 7 is somewhat higher than it has been at any time during the year—71 per 1,000.

There has been a marked improvement in the admission rate for communicable disease, exclusive of influenza and venereal disease, during the past month. However, measles, mumps, and scarlet fever are still more prevalent than usual, both ashore and afloat.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of March, 1923, in comparison with the mean annual admission rates, month of March, for the five-year period 1918-1922, inclusive:

	March, 1918-1922.	March, 1923.
Cerebrospinal fever.....	0.52	0
Diphtheria.....	4.07	.31
German measles.....	1.79	.41
Influenza.....	136.47	114.19
Malaria.....	24.23	7.94
Measles.....	7.74	25.66
Mumps.....	33.55	22.57
Pneumonia.....	10.85	12.57
Scarlet fever.....	3.15	5.67
Smallpox.....	.48	.10
Tuberculosis.....	3.32	3.71
Typhoid fever.....	.09	.10

It will be noted in the above table that the admission rate for measles is much higher than the five-year norm from 1918-1922, inclusive, whereas malaria is less prevalent. Measles is less prevalent at the Naval Training Station, Hampton Roads, than previously. During the four-week period ending April 7, mumps has appeared at that station. Scarlet fever and measles are prevalent at the Naval Training Station, San Francisco.

Mumps and measles have been prevalent in both the Atlantic and Pacific Fleets and scarlet fever among the ships of the Pacific Fleet. The U. S. S. *Idaho* reported one case of smallpox in February.

There has been little change in the venereal-disease situation during the past four weeks, the average admission rate for the year, entire Navy, being 122 per 1,000.

Tonsillitis and bronchitis, as to be expected at this season of the year, are much less prevalent than during January, February, and March. The admission rate for tonsillitis for the week ending April 7 was 65 per 1,000 per annum as compared with an average rate of 88 per 1,000 for the previous portion of the year, and the admission rate for bronchitis for the same period was 32 per 1,000 as compared with an average rate of 83 per 1,000 for the previous portion of the year.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"FLORIDA" FOR THE YEAR 1922.

Poisoning by fish.—Two epidemics of fish poisoning occurred during the year—the first in March, the second in July. At both times the ship was stationed at Culebra, Porto Rico, the fish in each instance being caught in the same general location in the neighborhood of the Virgin Islands and were eaten only by wardroom officers and officers' servants.

In the first epidemic the fish involved were of the variety known at St. Thomas as the "carang" and designated popularly aboard ship as a variety of skipjack. They were caught in the afternoon, salted, kept in the wardroom refrigerator, and served at luncheon the following day. The taste and odor of these fish were beyond criticism.

The first symptoms noticed by the men affected appeared in about three to four hours after the meal; vertigo, nausea, and diarrhea were common to all the cases. Subnormal temperature and a slow pulse were general symptoms. The majority of the patients complained of muscular and joint pains and itching of the skin, in some instances the joint pains continuing for a period of two to three weeks. While many of the cases were severely prostrated during the night it was necessary to admit only four to the sick list

the following morning. A total of 22 officers and servants reported that they had been affected.

The second epidemic occurred in July, and as formerly, at Culebra. The fish were caught in the vicinity of St. Thomas, Virgin Islands. One barracuda and one "carang" (skipjack) were caught in the afternoon, salted, placed in the wardroom refrigerator, and served the following noon to the wardroom officers at luncheon. Again, there was nothing in the taste or odor of the fish to cause suspicion as to freshness. In fact, the delectable quality of the fish was commented on at the time. The incubation period and symptoms of the disease were, in general, similar to those reported for the first epidemic, but the symptoms tended to be more severe.

The symptoms resulting from eating both species of fish were entirely similar. Six officers and one officer's servant were actually admitted to the sick list, but symptoms of varying severity were reported from a large majority of the officers and servants. As in the first epidemic, none of the men affected in this epidemic were found to be seriously ill. Joint pain, however, was a much more conspicuous complaint, persisting for days or even weeks.

The question arises whether these outbreaks of food poisoning were due to a poison inherent in the fish or to putrefactive changes resulting from bacterial infection of the fish. That putrefactive changes can occur in fish without apparent alterations in taste or odor is well known. This whole subject is elaborately discussed by Lieut. F. V. Walker, Medical Corps, U. S. Navy, in an article entitled "Fish poisoning in the Virgin Islands" in the U. S. Naval Medical Bulletin, August, 1922. Lieutenant Walker analyzes certain epidemics due to barracuda and the type of "carang" which is caught near the surface. He concludes that the weight of the evidence is in favor of food poisoning or bacterial infection of the fish and not fish poisoning—in all probability due to the method of handling of the fish. The symptomatology of the epidemics at St. Thomas and of the epidemics observed by the writer are quite alike.

A significant point is that the "carang" caught near Culebra and eaten aboard the U. S. S. *Delaware* did not produce any toxic effects. The writer is of the opinion that the cases occurring aboard the U. S. S. *Florida* were probably due to food poisoning as the result of eating fish and not to a specific toxin preformed in the fish.

In conclusion, it is emphasized that fish may spoil very rapidly under tropical conditions, and even when slightly decomposed may contain putrescent substances causing violent illness. Every effort should be made in the Tropics to chill fish at once after the catch and to keep them on ice at all times to prevent such decomposition. Only the shortest practicable time should be allowed between time of catching and eating.

Influenza.—A definite epidemic of influenza appeared in December, 1922, and was quite similar in general character to the various epidemics of influenza reported from ships of both the Atlantic and Pacific Fleet in the early part of 1922. Sporadic cases of influenza began to appear about December 7. The epidemic appeared suddenly on December 14, 34 admissions occurring on that day. On December 15, 52 cases were admitted; and on December 16, 16 cases were admitted. The epidemic then subsided rapidly. During these 3 days 75 cases were transferred to the hospital. After December 16, the sick-bay facilities of the ship were sufficient to handle the situation. The disease continued in epidemic form until January 1, 1923. There were 130 total admissions for December, of which 80 cases were transferred to the hospital. The annual admission rate for influenza for December was 158 per 1,000. The symptoms were essentially the same in practically all the cases. Attacks usually began in the early morning hours; the chief complaint being chilliness, headache, pains in limbs and back, and a hard, paroxysmal, dry cough. Pharyngitis and acute coryza were fairly common symptoms. There was decided prostration. The average duration of the acute stage varied from 2 to 4 days. The patients had fever ranging from 101° F. to 103° F. From 5 to 10 days were required for complete convalescence. Of course, a considerable number of mild cases were ambulatory, and although under treatment, were not admitted to the sick list.

The following sanitary measures were rigidly enforced, i. e., special supervision of the sterilization of mess gear; sterilization of mouthpieces of scuttle butts twice daily; sterilization of deck swabs daily; all men made to sleep head to foot; all decks of living spaces, wash rooms, pantries, and heads scrubbed down daily with disinfectants. No quarantine of the ship was recommended, as influenza was present on other ships and on shore. The period of incubation of influenza is so short and the virus, as carried by mouth and nasal spray, so highly infectious, it is difficult to estimate the value of any of the usual methods of sanitary control.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"MISSISSIPPI" FOR THE YEAR 1922.**

The health conditions on board ship were excellent during the year and are an index of the excellent sanitary condition of the ship. The annual admission rate for all causes (diseases and injuries) for the year was 344.47 per 1,000, which is below the average for the Pacific Fleet and is lower than the previous year for this ship—810.39 per 1,000. This excellent result is attributed

to the keen interest of the commanding officer in having a clean and snappy ship. During the last 10 days of the year five cases of measles and two cases of mumps developed among a draft of 200 men received from the U. S. S. *Henderson*, where these diseases prevailed. In the absence of the hospital ship these cases could not be transferred from the ship, and in all probability it is the beginning of an epidemic. All precautionary measures against the spread of the diseases are being taken.

Chicken-pox.—Two sporadic cases of chicken-pox developed during the year and were contracted ashore while on liberty.

Influenza.—A mild form of "la grippe" prevailed among the crew during the latter part of December. Fifty-eight cases developed. The disease responded to treatment in three days, which indicates the mildness of the infection.

Venereal disease.—This disease gave rise to 87 admissions and 20 readmissions, an annual admission rate of 78.66 per 1,000. This ship has next to the lowest number of venereal infections for the year of any ship in the battleship and cruiser force in the Pacific Fleet. This may be attributed to the high morale of the crew, which is accomplished by preoccupying the mind of the crew in athletic sports, for which this ship is noted.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"UTAH" FOR THE YEAR 1922.**

There was only one epidemic during the year, when 91 cases of bronchitis, acute, were admitted during the month of January. These cases resembled influenza, but the symptoms in nearly all were mild and prostration was not severe. All these cases were treated aboard ship. It was necessary to use a separate compartment in addition to the sick bay.

While in European waters every precaution was used to prevent the crew from contracting venereal disease. Lectures were given to the men in small groups and the danger of illicit intercourse plainly pointed out to them. The venereal prophylactic room was open at all times when liberty parties returned. Prophylactic stations were established ashore in nearly every port to give the men the advantage of early treatment. Venereal prophylactic tubes were issued to all men who desired them.

Liberty has been granted freely on this ship and at times as many as 250 admitted exposure to venereal disease have occurred in one night. Notwithstanding all that has been done, the percentage of venereal disease has been high. The men use alcoholic liquors freely when ashore, cohabit with prostitutes, and refuse to consider the dangers incurred.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE DESTROYER SQUADRONS, BATTLE FLEET, FOR THE YEAR 1922.

The general health of the men in the destroyer squadrons has been excellent. In February and March there was an outbreak of an influenzal nature that ran up the sick rate for these months, but it was not attended by the serious results of the 1918 epidemic, and was no doubt a different infection.

In December the U. S. S. *Henderson* arrived from the east coast with a draft of men, some of whom came to the destroyers. A case of measles developed during the trip and approximately 30 cases have developed in the draft since it was received. To date there have been no fatalities. The disease was confined to the new arrivals. Those ships in which cases occurred were quarantined to prevent the spread of measles in the squadrons. Suspected cases were sent to the hospital. All ships were instructed to give special care in cleaning mess gear and airing bedding.

Venereal diseases.—The venereal-disease situation in the destroyer squadrons has been, on the whole, very good. The reports for October show a decided increase in admissions, which was due to the arrival of the Asiatic destroyers. Lectures were given to the crews by medical officers and bulletins and placards were published.

A short distance outside the base of the destroyer squadrons very undesirable conditions exist; the population there is made up largely of negroes and Mexicans. The civil authorities have been notified of sources of infection and every effort has been made to rid the locality of the infected individuals.

Vaccinations.—In the course of inspection of the crews of various ships, it became apparent that smallpox vaccination had not received the proper attention. A number of cases were found in which no evidence of a successful vaccination existed. Instructions were given to medical officers to make a careful personal inspection of the crews of the ships in order to satisfy themselves of the actual condition, and to vaccinate such men who did not show evidence of successful vaccination. The prevalence of smallpox in the United States during the past three years, and the more virulent character of the disease this year than heretofore, was brought to the attention of medical officers.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S. "LAWRENCE" FOR THE YEAR 1922.

During the first part of the year while this vessel was operating with the Atlantic Fleet or based on an American port the percentage of sick was low. In July the U. S. S. *Lawrence* was ordered to

European waters for duty, and since then the admissions for venereal disease have been high. This is due, principally, to the low morale of the people of the countries that we have visited since leaving the United States. The crew have been frequently warned of the dangers of infection and also as to the proper method of prophylaxis following exposure. A standard prophylactic locker containing a 2 per cent solution of protargol, 33 per cent calomel ointment, and syringes has been in commission and available to the men at all times. All men were instructed in the proper method of using the material and, in addition, written directions were placed inside the door of the locker. Venereal prophylactic tubes were also issued to all men requesting them. The admissions for venereal disease continued to be high despite the above precautions. In August the detachment commander issued a general order requiring all men going on liberty to be issued a venereal prophylactic tube at the time of checking out on liberty. When the men returned from liberty the tube was turned in, if not used, or a note was made opposite his name as to the time elapsing between exposure and prophylaxis. Following the inauguration of this method the number of infections have decreased rapidly. It is not believed that the infections contracted were due to the fault of the tube but due to the fact that the men did not use them at all or a considerable period of time had elapsed between exposure and prophylaxis.

During the months of September and October this ship was handling refugees in and about the port of Smyrna. A landing party of 28 men was maintained ashore most of the time. Each man was furnished with a first-aid packet and instructed as to its use. Headquarters for this landing party was established in a theater on the water front until it was destroyed by the fire that swept the city. This building was cleaned and disinfected with cresol. During the time that refugees were on board they occupied the after crew's quarters. After the refugees were landed the compartment occupied by them was thoroughly cleaned and scrubbed with a 5 per cent solution of phenol. All mess gear and other utensils used by refugees was boiled.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, FOURTH REGIMENT, UNITED STATES MARINE CORPS, NORTHERN DISTRICT, DOMINICAN REPUBLIC, FOR THE YEAR 1922.

The health of the command has been excellent. Dengue, venereal diseases, and dysentery have caused the greater proportion of the admissions for communicable diseases. During the early part of the year an epidemic of smallpox swept over the country and caused considerable damage to the native population. The large number of

deaths among the natives, however, is thought to be due to lack of proper care rather than to the severity of the symptoms. The relief work performed by Dominicans under the supervision of Lieut. J. K. Gordon, Medical Corps, United States Navy, during the latter part of the epidemic alleviated conditions.

Malaria occurs rarely in Santiago. Several cases were contracted at San Francisco de Macoris. Compulsory use of mosquito bars by all men, the necessary drainage, and the use of the "follow-up method" of treatment have been employed to combat the disease. The few cases occurring have been of the benign tertian type.

Dengue has been quite prevalent. It was less prevalent among enlisted men than among the officers and their families. This is thought to be due to the difference in sleeping quarters. The men are quartered in tents with tent flies triced up, or in open barracks where the breezes have a good sweep. The few mosquitoes present are driven away, whereas the officers' quarters are imperfectly screened or not screened at all, allowing the mosquitoes to gain entrance. Furthermore, the houses are so constructed that the breezes do not pass through as readily as in tents and barracks.

Dysentery with stools containing blood and mucus has been rather common. *Amœba* are rarely found although repeatedly searched for. The symptoms are more of the bacillary type of the disease. Dysentery is a very common disease among the natives, who rarely boil drinking water or take other precautions. All water used by the marines for drinking purposes and washing of dishes is boiled and filtered. Men are instructed by means of lectures as to how dysentery may be contracted and what measures should be used to avoid contracting the disease.

Venereal diseases have been combated by lectures, compulsory venereal prophylaxis, and the reporting of all men to the commanding officer who develop venereal disease and failed to take prophylaxis; issue of compound calomel ointment in collapsible containers to all men desiring the same; weekly venereal inspections of all men; orders forbidding the men to enter restricted areas and punishment for those who are found there; and deportation of known prostitutes. The commanding officer of the regiment has himself given several lectures to officers and men on this subject and has done all he can to lessen the venereal-disease incidence. He has also tried to inculcate the same spirit among his officers and men.

Every means are taken to provide healthy sports and recreation for the men in order to preserve their health and morale. The cheap and easily obtainable alcoholic liquors combined with the high venereal-disease rate among the native population makes the venereal-disease problem a much greater one in this locality than

in the United States. Of the venereal diseases, syphilis has a relatively higher incidence than either chancroid or gonococcus infection in comparison with venereal-disease incidence in the United States.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE MARINE DETACHMENT, AMERICAN LEGATION, PEKING, CHINA, FOR THE YEAR 1922.

The high annual admission rate for venereal disease at this post is considered to be due to the fact that there is no control over the houses of prostitution in Peking. During the past year there has been a slight increase in the number of gonorrhea and chancroid cases, but the number of cases of syphilis have been less. With the present method of supplying prophylactic tubes for immediate use there is no means of determining their efficacy because of the fact that it is impossible to maintain any check on the statement of the patient that prophylaxis was used. Practically every man presenting himself with a venereal disease claims to have used a standard tube immediately after exposure. Occasionally statement is made that two or three hours had elapsed, but failure to use prophylaxis is never admitted.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE FIFTH BRIGADE, U. S. MARINE CORPS, HEADQUARTERS, SAN DIEGO, CALIF., FOR THE YEAR 1922.

The annual admission rate for injuries was 106.27 per 1,000. This is high when compared with the annual admission rates for injuries for 1921 for the entire service and for the entire Marine Corps which were 57.11 per 1,000 and 61.21 per 1,000, respectively. Of the types of injuries recorded, sprain and fracture caused 20 per cent of the total injuries; contusion, 16.3 per cent; wounds, 12.7 per cent; and strains, 9 per cent.

The causes of injury were largely confined to key letters J (athletics), and L (unclassified); 49 per cent being grouped under the former and 34.5 per cent under the latter. Three and six-tenths per cent of the total injuries (two cases) resulted from bullet wounds of the hand, both accidental and due to carelessness in handling revolvers. There were no accidents on the rifle range. Automobile and motor-cycle accidents caused 20.7 per cent of all injuries.

Location of injuries on the body were as follows: (a) Lower extremity, 47 per cent; (b) upper extremity, 25.5 per cent; (c) head, 17.6 per cent; (d) trunk, 9.9 per cent.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE NAVY YARD,
BOSTON, MASS., FOR THE YEAR 1922.**

Medical assistant to safety engineer.—In compliance with the letter of the Secretary of the Navy of July 6, 1922, an office of safety engineering was created at the navy yard, and a medical officer was detailed as medical assistant to the safety engineer. This medical officer makes weekly inspections of all places frequented by civilian employees of the navy yard, including ships on which work is in progress, and submits a report covering any hazards likely to cause disease or injury. He also reports on hygienic and sanitary conditions of plans inspected. In addition, the medical officer carries out a campaign of education as to personal hygiene, etc. He also has supervision over the preparation of the accident reports, records, and statistics.

Since the establishment of this office the medical assistant has submitted reports covering obnoxious or poisonous gases in workshops, ventilation, humidity, and temperature of working spaces, dust in certain buildings, excessive number of eye injuries, and the cafeteria situation.

The Bureau of Medicine and Surgery has recently designated one of the medical officers attached to the navy yard for a course of instruction in industrial hygiene at the Harvard Medical School, which should prove both beneficial and useful.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.
Serial No. 251-1923.

WSG: 126750-0(23).
125282-0(24).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., March 20, 1923.

To: All naval hospitals.

Subject: Medical periodicals and books.

Reference: Letter from Secretary, #5438-2160, February 20, 1923, in reply to bureau's communication #126750, June 21, 1922.

1. By direction of the Secretary of the Navy (ref.), all Medical Department periodicals, etc., for the bureau, including hospitals, yards, stations, and ships, for the fiscal year 1924 and thereafter, will be subscribed for to be delivered to and distributed from the bureau.

2. In accordance with the foregoing, hospitals, yards, stations, and ships will not submit requisitions for medical periodicals, etc., for the fiscal year 1924 and thereafter; standard and uniform lists of periodicals have been adopted for each hospital, yard, station, and ship, according to the various needs, copy of which will be furnished at a later date; requisitions already rendered will be destroyed upon reaching the bureau; distribution will be made from the bureau each week on and after July 1, 1923.

3. That naval hospitals may have better and more uniform reference libraries, the following list of books is offered for consideration, from which each hospital may make selection. Please note that the list is arranged in two parts, as "A. For all hospitals," and "B. For additional books for the larger hospitals at Chelsea, Newport, New York, League Island, Washington, Annapolis, Norfolk, Great Lakes, San Diego, and Mare Island."

A. FOR ALL HOSPITALS.

REFERENCE LIBRARY FOR MEDICAL OFFICERS.

Anatomy:

Applied Anatomy, by Davis (Lippincott) \$8. 50

Aviation:

The Air Service Manual, by U. S. Army Air Service Free.

Chemical warfare:

Chemical Warfare, by Fries and West (McGraw-Hill) 2. 50

Dietetics:

Newer Knowledge of Nutrition, by McCollum, 2d edition (Macmillan) 3. 80

Eye, ear, nose, and throat:

Diseases of the Ear, by Kerrison, 2d edition (Lippincott) 6. 50

Field service:

Outline of Medical Service in the Theater of Operations, by Shockley (Blakiston) 2. 50

Laboratory:

Bacteriology, by Hiss, Zinsser, and Russell, 5th edition (Blakiston) .. 7. 50

Materia medica and therapeutics:

Materia Medica, by Bastedo (Saunders) 6. 00

Principles of Therapeutics, by Osborne (Saunders) 7. 00

Medicine:

Chemical Analysis of the Blood, by Myers (Mosby) 3. 00

History of Medicine, by Garrison, 3d edition (Saunders) 9. 00

Montaigne and Medicine, by Taylor (Hoeber) 3. 75

Medicine, tropical:

* Tropical Diseases, by Manson-Bahr, 7th edition (Wood) 10. 00

Obstetrics and gynecology:

Gynecology, by Anspach, latest edition (Lippincott) 9. 00

Obstetrics, by DeLee (Saunders) 12. 00

Pediatrics:

Pediatrics, by Kerley (Saunders) 9. 00

Physiology:

Physiology, by Howell, 8th edition (Saunders) 6. 50

Physiotherapy:

Principles of electrotherapy, etc., by Turrell (Frowde, Hodder & Stoughton) (?)

Rational Hydrotherapy, by Kellogg (Modern Medicine Publishing Co.) 6. 00

Redeeming the Maimed, by McKenzie R. Tait (Hoeber) (?)

Surgery:

Treatment of Fractures, by Scudder, 9th edition (Saunders) 7. 00

Anaesthesia, by Gwatheney 6. 50

Urology:

Syphilis, by Hazen (Mosby) 7. 50

X ray and radium:

U. S. Army X-ray Manual Free.

REFERENCE LIBRARY FOR NURSES AND HOSPITAL CORPS MEN.

Anatomy and physiology:	
Anatomy and Physiology for Nurses, by Lewis (Saunders)-----	\$2. 25
Pharmacy:	
Why's in Pharmacy, by Ruddiman (Wiley & Sons)-----	1. 00
Pharmaceutical Incompatibilities, by Ruddiman (Wiley & Sons)---	2. 00
Materia medica:	
Useful Drugs, by American Medical Association-----	Free.
Minor surgery and first aid; bandaging:	
Treatment of Emergencies, by Owen (Saunders)-----	2. 25
Minor and Operative Surgery, by Wharton (Lippincott)-----	3. 00
Nursing:	
Practical Nursing, by Maxwell and Pope (Putnam & Sons)-----	2. 00
Nursing in the Acute Infectious Fevers, by Paul (Saunders)-----	1. 75
Dietetics for Nurses, by Friedenwald and Ruhrah (Saunders)-----	2. 25
Miscellaneous:	
Food Inspector's Encyclopedia, by Walker (Hoeber)-----	3. 00

B. IN ADDITION TO THE PRECEDING, THERE MAY BE ADDED THE FOLLOWING FOR THE LARGER HOSPITALS AT CHELSEA, NEWPORT, NEW YORK, LEAGUE ISLAND WASHINGTON, ANNAPOLIS, NORFOLK, GREAT LAKES, SAN DIEGO, AND MARE ISLAND:

REFERENCE LIBRARY FOR MEDICAL OFFICERS.

Eye, ear, nose, and throat:	
Bronchoscopy and Esophagoscopy, by Jackson (Saunders)-----	(?)
Medicine:	
Neoplastic Diseases, by Ewing, 2d edition (Saunders)-----	(?)
Infection and Resistance, by Zinsser, 2d edition (Macmillan)-----	\$4. 50
Diseases of the Heart and Aorta, by Hirschfelder (Lippincott)-----	8. 00
Basal Metabolic Rate Determination, by Boothby and Sandifund (Saunders)-----	(?)
Medical Diagnosis, by Greene, 5th edition (Blakiston)-----	12. 00
Endocrines, by Bandler (Saunders)-----	7. 00
Nervous and mental diseases:	
Handbook of Mental Examinations and Methods, by Franz (Mac- millan)-----	(?)
War Neurosis and Shell Shock, by Mott (Oxford Press)-----	(?)
Physics:	
Physics, by Ganot (Wood)-----	5. 00
Physiology:	
Physiology and Biochemistry in Modern Medicine, by MacLeod, 4th edition (Mosby)-----	11. 00
Physiotherapy:	
Treatment of Joint and Muscle Injuries, by Bristow (Henry Frowde, London)-----	2. 00
Nerve Wounds, by Tinel, Jules (Wood)-----	(?)
Surgery:	
Operative Surgery, by Binnie (Blakiston)-----	2. 00
Infection of the Hand, by Kanavel, 4th edition (Lea and Febiger)---	5. 50

Surgery—Continued.

Surgical and Mechanical Treatment of Peripheral Nerves, by Stokey (Saunders)	(?)
Surgical Shock, by Crile, 2d edition (Saunders)	\$6. 50
Thyroid Gland, by Crile (Saunders)	5. 00
Diagnosis and Treatment of Brain Injuries, by Sharpe (Lippincott)	8. 00
Diseases of the Rectum and Colon, by Lynch (Lea and Febiger)	6. 50
Surgery of the Upper Abdomen, by Deaver and Ashurst (Blakiston) ..	11. 00
Regional Anaesthesia, by Labat (Saunders)	7. 00
Orthopaedic Surgery, by Jones and Lovett (Wood)	9. 00

X ray and radium:

Injuries and Diseases of the Bones and Joints, by Baetjer and Waters (Hoerber)	9. 00
Roentgen Diagnosis of Diseases of the Alimentary Canal, by Carman (Saunders)	8. 50
Roentgen Interpretation, by Holmes and Ruggles, 2d edition (Lea & Febiger)	(?)
X ray and Radium in the treatment of Diseases of the Skin, by Mackee, 8th edition (Chicago Medical Book Co.)	(?)

REFERENCE LIBRARY FOR NURSES AND HOSPITAL CORPS MEN.**Chemistry:**

Outlines of Chemistry, by Kahlenberg and Hart	2. 60
Pharmaceutical Chemistry, by Sadtler & Coblentz (Lippincott)	5. 50
Organic Chemistry, by Leffman and LaWall (Blakiston)	(?)

Pharmacy:

Art of Compounding, by Scoville (Blakiston)	2. 25
Pharmaceutical Arithmetic, by Sturmer (Philadelphia School of Pharmacy)	1. 35
Pharmaceutical Botany, by Youngken (Blakiston)	3. 75

Materia medica:

Materia Medica and Therapeutics, by White and Wilcox (Blakiston)	4. 00
Quiz Compend on Materia Medica, Therapeutics, etc., by Potter (Blakiston)	2. 00

X ray:

Principles and Practice of Roentgenological Technique, by Hirsh (X ray Publishing Co., N. Y.)	(?)
---	-----

Hygiene and sanitation:

Preventive Medicine, by Mark F. Boyd (Saunders)	4. 00
Hygiene and Sanitation, by Egbert (Lippincott)	(?)
Field Sanitation, by Lelean (Blakiston)	2. 25

Physiotherapy:

Massage and Therapy Exercise, by Macmillan (Saunders)	2. 25
---	-------

Miscellaneous:

Elements of Physics, by Page, (Keener & Co.)	1. 50
Bacteriology for Nurses, by Boldnan and Grund, 2d edition (Saunders)	2. 00

4. Each hospital will immediately submit to the bureau a Form 4 requisition for such of the above-listed books as may be desired, care being exercised to avoid duplication of books already on the shelves; especial attention has

been given toward securing books of value for the reference library for the use of the Hospital Corps men.

5. Please enter the cost, as given herein, in the body of the requisition, but not in the column "Value".

E. R. STITT.

HWS:MFD:130402(34).

Circular letter.

Serial No. 252-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., March 30, 1923.

To: All medical officers.

Subject: Assembling a teaching collection of Röntgenologic material.

Reference: Circular letter 187-1922.

1. The lack of Röntgenologic material, suitable in character and adequate in amount for teaching, being keenly felt at the U. S. Naval Medical School, medical officers are requested to forward to the school films that would be of value for purposes of instruction. Films that portray well the characteristics of more common lesions are desired as much as records of more unusual conditions.

2. It is requested that films be accompanied by the name, rank, and station of the medical officer forwarding them, in order that acknowledgment may be made, and that there be attached the diagnosis and any other essential data.

E. R. STITT.

WSD/JBC:126750-0(23).

Serial No. 253-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 6, 1923.

To: All naval hospitals.

Medical officer, all navy yards and naval stations.

Post surgeon, marine barracks, Quantico, Va.

Naval medical supply depot, Brooklyn, N. Y.

U. S. S. *Mercy*.

U. S. S. *Relief*.

Naval Medical School.

Naval Dispensary, Navy Department.

Subject: Medical periodicals.

Reference: M. & S. circular letter, serial No. 251-1923, #126750.0(23) March 20, 1923, to hospitals only.

1. By direction of the Secretary of the Navy, all Medical Department periodicals for the fiscal year 1924 and thereafter will be subscribed for by and delivered to the bureau for distribution.

2. As directed in reference, Medical Department activities will not submit requisitions for medical periodicals for the fiscal year 1924 or thereafter, and requisitions already submitted will be canceled.

3. Standard and uniform lists of periodicals have been adapted for each Medical Department activity, and distribution will be made from the bureau in accordance therewith, beginning July 1, 1923, weekly or monthly as the case may be.

4. Medical Department activities having requisitions for periodicals for the fiscal year 1923, upon receipt of this letter will promptly notify the publishers of the various journals (also the contractor, when the journal is received other than from the publisher) to discontinue service upon termination of present subscription, which (except at the Naval Medical School and naval medical supply depot, Brooklyn) will be with the expiration of the current fiscal year, June 30, 1923. This is most important in order to prevent future difficulty on account of claims for payment for numbers sent after expiration of subscription, as is the practice of some publishers in expectation of delayed renewals. The following form of letter is suggested:

By direction of the Secretary of the Navy, no further subscriptions for medical journals will be placed directly by this ----- All periodicals for the Medical Department of the Navy will be subscribed for by and distributed from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

It is therefore requested that our subscription for (name of journal) be discontinued promptly with the mailing of the last issue under present order, which terminates (June 30, 1923).

5. The standard distribution list adopted is as follows:

- (a) Naval Hospitals, Chelsea, Newport, New York, League Island, Washington, Annapolis, Norfolk, Pensacola, Great Lakes, Mare Island, San Diego, Canacao, U. S. S. *Mercy*, U. S. S. *Relief*:
Journal of the American Medical Association.
American Journal of Medical Sciences.
Surgery, Gynecology and Obstetrics.
Journal of Dental Research.
American Journal of Nursing (2 copies).
American Journal of Pharmacy.
Annals of Surgery.
Archives of Radiology and Electrotherapy.
Journal of Nervous and Mental Diseases.
Archives of Ophthalmology.
Tropical Diseases Bulletin (Canacao only).
Public Health Reports.
Naval Medical Bulletin and Supplement.
- (b) Naval Hospitals, Portsmouth, Charleston, Parris Island, Key West, Puget Sound, Pearl Harbor, Guam, St. Thomas; Naval Station, Tutuila, Samoa; Marine Barracks, Quantico, Va.:
Journal of the American Medical Association.
American Journal of Medical Sciences.
Surgery, Gynecology and Obstetrics.
Journal of Dental Research.
American Journal of Nursing (2 copies).
American Journal of Pharmacy.
Tropical Diseases Bulletin (Guam, Samoa, and St. Thomas only).
Public Health Reports.
Naval Medical Bulletin and Supplement.
- (c) Naval Hospital, Yokohama:
Public Health Reports.
Naval Medical Bulletin.
Journal of American Medical Association.
Surgery, Gynecology, and Obstetrics.
Tropical Diseases Bulletin.

- (d) Navy yards and stations:
American Journal of Medical Sciences.
Journal of American Medical Association.
Public Health Reports.
Journal of Industrial Hygiene (industrial yards only).
Dental Cosmos (where there is a dental officer).
Tropical Diseases Bulletin (for tropical stations).
- (e) Naval medical supply depot, Brooklyn:
Chemical Abstracts.
Druggist's Circular.
Journal of Industrial and Engineering Chemistry.
Journal of American Medical Association.
- (f) Other Medical Department activities, with two or more medical officers:
Journal of American Medical Association.
American Journal of Medical Sciences.
Public Health Reports.
Dental Cosmos (where there is a dental officer).
- (f-1) One medical officer:
Journal of American Medical Association.
Public Health Reports.
Dental Cosmos (where there is a dental officer).
- (g) Hospital Corps schools:
Journal of American Medical Association.
American Journal of Pharmacy.
Journal of American Pharmaceutical Association.
- (h) Training stations and Naval Academy:
Journal of American Medical Association.
Public Health Reports.
American Journal of Medical Sciences.
Journal of Dental Research.
Journal of American Dental Association.
Dental Cosmos.

6. Endeavor will be made promptly to forward the journals in accordance with the foregoing. Only a sufficient number of each journal has been ordered to supply anticipated requirements, however, and some variation from the list may be required, from time to time, to provide for changes or new activities.

E. R. STITT.

VITAL STATISTICS.

In the future the "Monthly Health Index," which will be published on the 15th of each month, will contain statistical data for individual ships and shore stations. The statistics appearing in this bulletin are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{1}{4}$ or $\frac{1}{5}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity in the United States Navy and Marine Corps for the month of March, 1923.*

	Entire Navy.	Forces afloat.	Forces ashore.	Marine Corps.
Average strength.....	116,433	74,143	42,290	20,555
All causes:				
Number of admissions.....	8,348	3,950	4,398	1,462
Annual rate per 1,000.....	806.34	639.27	1,247.93	924.63
Disease only:				
Number of admissions.....	7,652	3,554	4,098	1,356
Annual rate per 1,000.....	788.62	575.18	1,162.80	857.59
Communicable diseases, exclusive of venereal disease:				
Number of admissions.....	1,959	841	1,118	437
Annual rate per 1,000.....	201.89	136.10	317.21	276.38
Venereal disease:				
Number of admissions.....	1,272	867	405	208
Annual rate per 1,000.....	131.09	140.32	114.92	131.55
Injuries and poisons:				
Number of admissions.....	696	396	300	106
Annual rate per 1,000.....	71.73	64.09	85.13	67.04

TABLE No. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of March, 1923.*

	Forces afloat, Navy and Marine Corps (strength, 74,143).		Forces ashore, Navy and Marine Corps (strength, 42,290).		Total (strength, 116,433).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases.....	3,554	575.18	4,098	1,162.80	7,652	788.62
Injuries and poisons.....	396	64.09	300	85.13	696	71.73
Total admissions.....	3,950	639.27	4,398	1,247.93	8,348	860.34
Class III:						
Appendicitis, acute.....	47	7.61	55	15.61	8	10.51
Autointoxication, intestinal.....	11	1.78	21	5.96	32	3.30
Cholangitis, acute.....	20	3.24	13	3.69	33	3.40
Cholecystitis, acute.....	3	.49	0	0	3	.31
Cholelithiasis.....	2	.32	1	.28	3	.31
Colitis, acute.....	4	.65	1	.28	5	.52
Constipation.....	11	1.78	25	7.09	36	3.71
Enteritis, acute.....	22	3.56	21	5.96	43	4.43
Gastritis, acute catarrhal.....	3	.49	9	2.55	12	1.24
Gastroenteritis.....	47	7.61	38	10.78	85	8.76
Hemorrhoids.....	23	3.72	20	5.68	43	4.43
Pharyngitis, acute.....	26	4.21	42	11.92	68	7.01
Ulcer of duodenum.....	2	.32	1	.28	3	.31
Ulcer of stomach.....	3	.49	1	.28	4	.41
Total.....	224	36.25	248	70.37	472	48.64
Class VII:						
Varicocele.....	0	0	16	4.54	16	1.65
Class VIII:						
Chicken pox.....	1	.16	10	2.84	11	1.13
Diphtheria.....	1	.16	2	.57	3	.31
German measles.....	2	.32	2	.57	4	.41
Influenza.....	424	68.62	684	194.09	1,108	114.19
Measles.....	126	20.39	123	34.90	249	25.66
Mumps.....	176	28.48	43	12.20	219	22.57
Pneumonia, broncho.....	21	3.40	59	16.74	80	8.24
Pneumonia lobar.....	10	1.62	32	9.08	42	4.33
Scarlet fever.....	28	4.53	27	7.66	55	5.67
Smallpox.....	1	.16	0	0	1	.10
Total.....	790	127.85	982	278.64	1,772	182.62

TABLE NO. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of March, 1923—Continued.*

	Forces afloat, Navy and Marine Corps (strength, 74,143).		Forces ashore, Navy and Marine Corps (strength, 42,296).		Total (strength, 116,433).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class IX:						
Dysentery, bacillary.....	0	0	3	0.85	3	0.31
Dysentery, entamebic.....	1	.16	3	.85	4	.41
Total.....	1	.16	6	1.70	7	.72
Class X:						
Dengue.....	25	4.05	40	11.36	65	6.70
Filariasis.....	0	0	2	.57	2	.21
Malaria.....	9	1.46	68	19.30	77	7.94
Total.....	34	5.50	110	31.21	144	14.84
Class XI:						
Tuberculosis (all forms).....	16	2.59	20	5.66	36	3.71
Class XII:						
Chancroid.....	204	33.02	79	22.42	283	29.17
Gonococcus infection.....	577	93.38	231	65.55	808	83.27
Syphilis.....	86	13.92	95	26.96	181	18.65
Total.....	867	140.32	405	114.92	1,272	131.09
Class XVIII:						
Bronchitis, acute.....	273	44.18	417	118.32	690	71.11
Laryngitis, acute.....	6	.97	13	3.69	19	1.96
Pleurisy, acute fibrinous.....	13	2.10	12	3.41	25	2.58
Rhinitis, acute.....	5	.81	22	6.24	27	2.78
Tonsillitis, acute follicular.....	475	76.87	498	141.31	973	100.28
Total.....	772	124.94	962	272.97	1,734	178.71
Class XX:						
Hernias.....	20	3.24	25	7.09	45	4.64

TABLE NO. 3.—*Summary of annual admission rates for venereal disease reported from ships for February and from various shore stations for the four-week period, March 4 to March 31, 1923.*

	Annual rate per 1,000, February.			Average rate since Jan. 1, 1923.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	0	112.59	1,016.95	21.80	118.92	1,882.35
Battleship and cruiser force:						
Atlantic Fleet.....	9.90	96.99	168.80	21.80	140.25	304.76
Pacific Fleet.....	9.54	68.15	111.91	27.68	66.03	131.57
Asiatic Fleet.....	246.15	246.15	246.15	246.15	246.15	246.15
Destroyer force:						
Atlantic Fleet.....	0	204.66	1,016.95	53.57	209.56	1,882.35
Pacific Fleet.....	0	74.49	250.00	52.55	67.28	238.80
Asiatic Fleet.....	0	159.47	432.43	46.15	129.34	685.71
Miscellaneous:						
Atlantic Fleet.....	0	146.39	590.16	25.97	153.62	535.71
Pacific Fleet.....	0	117.70	390.95	35.04	116.59	471.30
Asiatic Fleet.....	60.61	369.23	642.95	122.45	595.67	1,371.43

TABLE No. 3.—Summary of annual admission rates for venereal disease reported from ships for February and from various shore stations, etc.—Con.

	Annual rate per 1,000, Mar. 4 to Mar. 31, 1923.			Average rate since Jan. 1, 1923.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States....	0	64.28	207.34	0	70.91	164.60
First naval district.....	0	18.75	106.25	32.53	47.48	58.80
Third naval district.....	0	49.85	149.18	17.03	58.03	128.80
Fourth naval district.....	58.47	120.56	207.34	96.23	132.41	164.60
Fifth naval district.....	42.98	84.57	114.54	68.72	83.47	120.77
Sixth naval district.....	14.10	18.20	97.01	26.94	41.42	42.42
Seventh naval district.....	0	0	0	0	0	0
Eighth naval district.....	68.42	82.92	94.28	48.14	76.62	82.28
Ninth naval district.....	32.62	32.62	32.62	35.84	35.84	35.84
Eleventh naval district.....	65.00	77.78	151.60	23.00	77.93	154.62
Twelfth naval district.....	35.86	58.07	77.53	48.18	81.04	112.68
Thirteenth naval district.....	26.17	124.14	196.97	8.48	56.07	105.19

RATIO OF GONOCOCCUS AND SYPHILIS INFECTIONS TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, Feb- ruary.		Per cent, since Jan. 1, 1923.	
	Gono- coccus.	Syphilis.	Gono- coccus.	Syphilis.
All ships.....	66.81	8.99	71.36	7.75
Battleship and cruiser force:				
Atlantic Fleet.....	72.50	11.25	73.44	10.37
Pacific Fleet.....	71.43	13.09	79.11	10.76
Asiatic Fleet.....	50.00	0	50.00	0
Destroyer force:				
Atlantic Fleet.....	55.70	8.86	67.52	6.70
Pacific Fleet.....	90.48	0	84.78	6.52
Asiatic Fleet.....	75.00	25.00	77.78	11.11
Miscellaneous:				
Atlantic Fleet.....	60.00	7.27	67.14	5.63
Pacific Fleet.....	69.56	8.69	68.84	7.97
Asiatic Fleet.....	75.00	0	65.45	0

	Per cent, Mar. 4 to 31, 1923.		Per cent, since Jan. 1, 1923.	
	Gono- coccus.	Syphilis.	Gono- coccus.	Syphilis.
All naval districts in the United States.....	71.43	13.64	76.17	15.24
First naval district.....	83.30	0	85.10	6.38
Third naval district.....	72.72	9.09	52.77	36.11
Fourth naval district.....	92.31	7.69	84.78	4.35
Fifth naval district.....	71.23	5.59	65.07	20.67
Sixth naval district.....	66.67	33.33	65.22	26.08
Seventh naval district.....	0	0	0	0
Eighth naval district.....	57.14	14.28	77.78	5.56
Ninth naval district.....	100.00	0	100.00	0
Eleventh naval district.....	90.00	0	85.19	11.11
Twelfth naval district.....	55.00	40.00	81.39	13.95
Thirteenth naval district.....	77.78	22.22	84.62	15.38

TABLE No. 4.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the four-week period, March 4 to March 31, 1923, inclusive.*

	Navy (strength 95,878).		Marine Corps (strength 20,555).		Total (strength 116,433).	
	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.
Diseases of blood.....	3	0.41	1	0.63	4	0.45
Diseases of circulatory system.....	39	5.29	8	5.06	47	5.25
Diseases of digestive system.....	525	71.18	159	100.56	684	76.37
Diseases of ductless glands and spleen.....	3	.41	1	.32	4	.45
Diseases of ear.....	95	12.88	9	5.69	104	11.61
Diseases of eye and adnexa.....	80	10.85	17	10.75	97	10.83
Diseases of genito-urinary system (non- venereal).....	141	19.12	35	22.14	176	19.65
Communicable diseases transmissible by oral and nasal discharges.....	1,237	167.71	356	225.15	1,593	177.86
Communicable diseases transmissible by intestinal discharges.....	3	.41	3	1.90	6	.67
Communicable diseases transmissible by insects and other arthropods.....	55	7.46	74	46.80	129	14.40
Tuberculosis (all forms).....	27	3.66	4	2.53	31	3.46
Venereal diseases.....	923	125.14	208	131.55	1,131	126.28
Other diseases of infective type.....	300	40.67	86	54.39	386	43.10
Diseases of lymphatic system.....	35	4.75	12	7.59	47	5.25
Diseases of mind.....	34	4.61	10	6.32	44	4.91
Diseases of motor system.....	72	9.76	29	18.34	101	11.28
Diseases of nervous system.....	47	6.37	13	8.22	60	6.70
Diseases of respiratory system.....	1,578	213.95	246	155.58	1,824	203.65
Diseases of skin, hair, and nails.....	71	9.63	29	18.34	100	11.17
Hernia.....	34	4.61	7	4.43	41	4.58
Miscellaneous diseases and conditions.....	102	13.83	26	16.44	128	14.29
Parasites (fungi and certain animal para- sites).....	106	14.37	23	14.55	129	14.40
Tumors.....	10	1.36	0	0	10	1.17
Injuries.....	507	68.74	97	61.35	604	67.44
Poisons.....	32	4.34	9	5.69	41	4.58
Total.....	6,059	821.48	1,462	924.63	7,521	839.72

TABLE No. 5.—*Deaths reported, entire Navy, for the four-week period, March 4 to March 31, 1923, inclusive.*

	Navy (strength 95,878).	Marine Corps (strength 20,555).	Total (strength 116,433).
Meningitis, cerebrospinal.....	2	0	2
Measles.....	6	1	7
Pneumonia, broncho.....	3	0	3
Pneumonia, lobar.....	2	0	2
Tuberculosis, chronic pulmonary.....	1	0	1
Caisson disease.....	1	0	1
Dysentery, entameble.....	1	0	1
Scarlet fever.....	2	0	2
Other diseases.....	11	1	12
Drowning.....	2	1	3
Other accidents and injuries.....	7	7	14
Poisons.....	1	0	1
Total.....	39	10	49
Annual death rates per 1,000, all causes.....	5.29	6.32	5.47
Annual death rates per 1,000, disease only.....	3.93	1.26	3.46

VOL. XVIII

NO. 6

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

JUNE, 1923
(MONTHLY)



Compiled and published under authority of Naval Appropriation
Act for 1923, approved July 1, 1922

WASHINGTON
GOVERNMENT PRINTING OFFICE
1923

NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 2, April, 1918.
Volume XII, No. 3, July, 1918.

SUBSCRIPTION PRICE OF THE BULLETIN.

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Yearly subscription, beginning January 1, \$1.50; for foreign subscription add \$1.00 for postage.

Single numbers, domestic, 15 cents; foreign, 21 cents, which includes foreign postage.

Exchange of publications will be extended to medical and scientific organizations, societies, laboratories, and journals. Communications on this subject should be addressed to the Surgeon General, United States Navy, Washington, D. C.

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PREFACE.

THE UNITED STATES NAVAL MEDICAL BULLETIN was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, editorial comment on current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the BULLETIN of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. STITT.

Surgeon General United States Navy.

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When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

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Only the names of actual reviewers for a current number appear.

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SPECIAL ARTICLES.

NOTES ON THE PRESENT STATUS OF ANTHELMINTIC MEDICATION.

By MAURICE C. HALL, Senior Zoologist, Bureau of Animal Industry, Washington, D. C.

Anthelmintics are ordinarily regarded as drugs intended to remove worms from the lumen of the digestive tract, but they may be regarded as drugs intended to destroy parasitic worms in any location. Of late years investigators have succeeded in finding a number of effective drugs for the control of worms outside of the digestive tract, and the status of this group of drugs is given special consideration here, being a comparatively recent development.

As regards the occurrence of flukes in the liver, it may be said that these parasites are rare in man. However, there appear to have been between 30 and 40 human cases, and it is of interest in this connection to know that there is a satisfactory treatment for the removal of the common sheep liver fluke, *Fasciola hepatica*, from its usual hosts, sheep, goats, and cattle. The drug most used is oleoresin of male fern, or one of the proprietary preparations containing the active ingredients, in one case the lipoid-soluble active ingredients, of male fern. Kamala is also more or less effective in removing these worms, but appears to be less effective than male fern. The efficacy of these drugs appears to depend in part on the blood-sucking habit of the fluke, as a related fluke, *Dicrocoelium dendriticum*, which does not have the blood-sucking habit, can not be removed from the bile ducts by these treatments. There appears to be no obvious reason why the male fern treatment should not be effective in those rare cases where infestation with *F. hepatica* is diagnosed ante mortem in man.

As regards the lung fluke, *Paragonimus westermani*, the present writer has seen a brief reference to a paper by Ando reporting good results in lung fluke infestation by means of intravenous injections of tartar emetic, but no definite findings are available at present in regard to this.

The most striking results in the control of fluke infestations occurring outside of the digestive tract have been obtained in treating cases of infestation with blood flukes. Most of the work has been done on *Schistosoma haematobium*, but apparently the treatments are also effective against *S. japonicum* and *S. mansoni* and, according to Cawston, against *S. bovis* also. Diamantis (1917; 1918) found emetine of value in destroying blood flukes, and though his findings were not substantiated by Morel and Maldonado (1918), they have been substantiated by Mayer (1918), Erian (1918), Balfour (1920), Day (1921), Tsykalas (1921), and others in thousands of cases. The drug is given intravenously, subcutaneously, and intramuscularly. Christopherson (1918) proposed the use of tartar emetic intravenously for schistosomiasis, this drug having been used previously in intravenous injections for the treatment of rats infested with the trypanosomes of nagana and surra by Plimmer and Thompson (1907), for the treatment of sleeping sickness by Broden and Rodhain (1908), of American leishmaniasis by Vianna and Machade (1913), and of Mediterranean and Indian leishmaniasis by other workers subsequently. Christopherson's successful use of this drug was followed by corroborative reports as to its value by McDonagh (1918), Wiley (1918), Low (1920), Cawston (1920; 1921), Christopherson and Newlove (1921), Day (1921), Lasbrey and Coleman (1921), and others. Cawston (1921) finds both emetine and tartar emetic effective against *S. haematobium*, *S. mansoni*, and *S. bovis*. Day (1920) believes that emetine is indicated in preference to tartar emetic for small children, persons with veins too small to inject readily, persons intolerant of tartar emetic, those in whom an error of technique has resulted in abscess formation, and in cases complicated by amebiasis. He also finds colloidal antimony effective and to be preferred to tartar emetic for treating children. Recently Wilson (1922) has reported favorably on the rectal administration of tartar emetic, a method which saves time, is free from risk, and causes less nausea and vomiting. The drug is absorbed by the veins of the intestine, thereby coming in contact with the worms in the blood.

So far as the control of cestodes outside of the lumen of the digestive tract is concerned, little has been accomplished along the lines of anthelmintic medication as yet. The claims in regard to successful medication for larval cestode infestation, made by Feletti (1894), de Renzi (1908), and Dianoux (1909) have not been substantiated by the investigations of Hall (1909), Moussu (1910), Dévé (1911), and Dévé and Payenneville (1914; 1922), with such drugs as male fern, neosalvarsan, and novarsenbenzol.

So far as regards successful anthelmintic medication for nematodes outside of the lumen of the digestive tract, a little has been accomplished, enough to show progress.

In the treatment of trichinosis recommendations of various drugs have been made largely on the basis of clinical improvement or cure, without reference to whether the encysted larvæ in the muscles were affected or not affected by the drugs. On such a basis claims have been made for salvarsan by McNerthy and McNerthy (1916), for thymol by Kahn (1917), and for gray oil by Rosique (1917). Eisenhardt (1918) found that thymol did not prevent the development of trichinæ, and Romanovitch (1912) found salvarsan devoid of action. There are several factors to be considered in trichinosis, and a given treatment may leave the larval worms in the tissues unaffected and at the same time aid the patient by the elimination of adult worms from the lumen of the intestine by neutralizing toxins, etc. Salzer (1916) found the use of serum from recovered patients valuable in the treatment of other patients, and claimed that the use of such a serum in experiment animals would prevent the development of trichinosis. Schwartz (1917) made experiments along this line and found that trichinæ would develop in animals regardless of the use of serum. Hall and Wigdor (1918) carried out similar experiments and confirmed Schwartz's findings to the effect that trichinæ would develop in spite of the use of serum, but they also found that animals given injections of serum from animals which had recovered from trichinosis usually lived longer than untreated animals. They concluded that the serum of recovered animals probably had antibodies which were of service in neutralizing certain worm toxins responsible for part of the pathological conditions. Ducas (1921) confirmed the findings of Schwartz and of Hall and Wigdor as regards the failure of serum to prevent the development of trichinæ, but did not find that the serum modified the toxic conditions present, as the work of Hall and Wigdor indicated was the case. However, he notes that he used but few experiment animals, and does not concur with Schwartz as to the impossibility of immunizing animals by repeated injections; on the contrary, he inclines to a belief in a relative immunity.

Considerable attention has been paid to the filarids in attempts to control nematodes not in the lumen of the digestive tract by anthelmintic medication. Schultz has reported success in killing the adult *Loa loa* in the connective tissue of man, together with the larvæ in the blood, by the administration of a 1 per cent solution of collargol in dessert-spoonful doses three times a day for over a year. Thiroux and d'Anfreville (1910) report the disappearance of *L. loa* in a patient treated with aniline tartrate. Morlot and Zuber (1914) report the disappearance of this worm following injections of neo-

salvarsan. Rogers (1919) and Das (1920) have reported favorably on tartar emetic in infestations with *Filaria bancrofti*, but Low and Gregg (1920), Macfie (1920), and Low and O'Driscoll (1921) report unfavorably on this drug, Macfie's cases including infestations with *F. bancrofti*, *F. perstans*, and *L. loa*. Low and O'Driscoll found emetine also ineffective, and though Mühlens (1921) has seen filariæ disappear from the blood after treatment with emetine, he regards this as spontaneous or accidental, another case showing no results after emetine, tartar emetic, and neosalvarsan. Siebert (1920) found that filariæ disappeared in the case of an undetermined species of filarid after treatment with picric acid and refers to Scheube (1910) as having seen the microfilariae of *F. bancrofti* die in the blood after the administration of potassium picrate. Ikegami (1920) reported that after two injections of arsaminol (Japanese salvarsan) in the case of one patient, the microfilariae disappeared from the blood and the urine became clear; no chyluria or other symptoms reappeared in over a year. Curasson (1920) reported that he treated three carrier crows of Senegal, all harboring microfilariae in the blood, with injections of galyol. The microfilariae disappeared from one bird for 9 days and then reappeared; no adult worms were found post-mortem. The microfilariae became rare and less active in the second bird; two adult worms were found dead in the abdomen post-mortem. No microfilariae were found in the third bird for 12 days; one worm, apparently dead, was found in the abdomen post-mortem. Macfie (1920) treated 23 patients infested with guinea worm, *Dracunculus medinensis*, by means of intravenous injections of tartar emetic; the worms and embryos died and could either be extracted safely or allowed to become absorbed. Jeanselme (1919), Montpellier and Ardoin (1919), and Grey (1920) report similar good results in infestation with guinea worm from the use of injections of novarsenobenzol.

The foregoing indicates that as yet we lack adequate evidence establishing any drug as effective in the treatment of cases of infestation with *Filaria bancrofti*; that we may have a satisfactory treatment for *L. loa*, though more work must be done to establish this; and that we apparently have satisfactory treatments for *Dracunculus medinensis*.

In view of our limited knowledge of anthelmintic medication in somatic helminthiasis, it may be noted, from the field of veterinary medicine, that Monbet (1913) has reported good results from the use of a watery solution of potassium permanganate, one or two parts per thousand, given hypodermically in a case of a horse infested with summer sores due to larvæ of worms belonging to the genus *Habronema*. Hall and Shillinger (1922) report experiments with intravenous injections of carbon tetrachlorid and of tartar emetic in the

cases of horses having verminous aneurisms due to larval or agamic forms of *Strongylus vulgaris*; their results were negative for the most part, but the finding of a dead worm in an aneurism in one case suggests that more work might lead to the development of a successful method of destroying the worms in these aneurisms by means of anthelmintics.

The subject of anthelmintics for removing worms from the lumen of the digestive tract is entirely too large for even a highly condensed consideration, as hundreds of substances have been used in this connection, many of them showing at least some slight anthelmintic efficacy. There is given here only a very brief statement in regard to a few treatments.

The drug which appears to be most effective in removing ascarids is oil of chenopodium, or its most active anthelmintic constituent, ascaridol. Apparently 1 c. c. of this drug is adequate for the removal of ascarids from adult persons. The drug is distinctly constipating and toxic. Purgation is essential to offset the constipating action of the drug and in this and other ways to protect the patient against the toxic effects. In experiments and in the experience of some physicians the simultaneous administration of castor oil in adequate amounts, about an ounce, with oil of chenopodium is highly protective against bad effects. Other physicians report adversely on the use of castor oil. At any rate, if the purgative is not given until two or three hours after the administration of the chenopodium, a fast-acting purgative, such as salts, should be given, rather than a slow-acting one, such as castor oil.

In this connection the writer would say that the distinction between vermifuges and vermicides is in his opinion entirely academic and useless, substituting a foggy mental picture for a definite one. Anthelmintics may act by producing muscular incoordination on the part of the worms, as santonin is supposed to do, the worm being carried out by peristalsis through inability to maintain itself in position, owing to incoordination; they may act by a depressant action on the musculature and nervous system of the worm, in which case they will probably act as a depressant to the unstriated musculature of the digestive tract, causing constipation, as chenopodium; they may exert a narcotic action or a solvent action or produce apparent tissue destruction, as carbon tetrachlorid does in the case of many hookworms or betanaphthol in the case of *Fasciolopsis buski*. In any event, if we resolve the action of the drug into terms of action on the parasite and action on the host we shall obtain a clearer picture than we can obtain from such vague terms as vermifuge and vermicide. From a practical standpoint it is not of interest or importance whether a worm is driven out dead or alive. Theoretically a worm might be temporarily stupefied or

otherwise affected by an anthelmintic, and unless promptly removed by peristalsis (which might or might not be due to a purgative) might recover and remain in the host animal, but in actual practice there is no evidence that anything of the sort occurs. If it does occur, it is a rare and unimportant thing. At present the term "vermifuge" appears to refer to drugs which are anthelmintic and purgative, and "vermicide" to drugs which are anthelmintic and not purgative or which are actually constipating. The vermifuges have a stimulant nature and the vermicides a depressant nature as regards their action on the musculature and nervous system of the worm and its host. The names themselves suggest a distinction based essentially on some action on the worm, whereas the true distinction is based on the stimulant or depressant action on the host.

The drug which is attracting the most attention at present in connection with the treatment of hookworm disease is carbon tetrachlorid. It has been reported for over 20,000 cases of hookworm disease in the Fiji Islands and has been used in thousands of cases elsewhere, the reports being for the most part very favorable. Apparently the drug occasions but slight symptoms of discomfort in most cases, is more effective than other drugs heretofore used in removing hookworms, and is quite cheap. Recent investigations indicate that it has some effect on the liver, as was anticipated from its resemblance to chloroform, but for the most part it appears to be quite safe if given in therapeutic dose. The dose originally advocated by Hall (1921), 3 c. c., appears to be safe and sufficiently effective to make larger doses inadvisable in the present state of our knowledge. While the preliminary work indicated that no purgative was necessary with this drug, recent studies indicate that the rather mild symptoms of discomfort which follow the administration of the drug are largely avoided if salts are given two or three hours after the carbon tetrachlorid. It should not be given with castor oil, as this diminishes its efficacy.

Whipworms are difficult to remove, apparently owing largely to the fact that anthelmintics passing the ileocecal valve may continue down the colon and not enter the cecum where the worms are situated. Theoretically, it should be possible to remove these worms by repeated doses of some anthelmintic or by the use of very bulky doses, thus insuring either by repetition or bulk the entry of the drug into the cecum. For repeated doses a drug which is not a gastrointestinal irritant should be used, and santonin is excellent for the purpose of repeated dosing. In experiments on dogs it has been found feasible to remove whipworms from the cecum by the administration of equal amounts of santonin and calomel in small doses daily for a week, the treatment then being suspended for a week, and then repeated for a week or until fecal examinations

showed the presence of whipworms in the feces and the subsequent absence of whipworm eggs. The same treatment might be effective in the case of man. In passing it may be noted that santonin in repeated small doses is more effective in removing ascarids than when given in a single large dose. Another drug which has been recommended as effective in removing whipworms is the latex of *Ficus laurifolia*, a South and Central American tree. This is given in large doses and the bulk of the dose may insure its entry into the cecum in many cases with a consequent removal of the whipworms present.

At the present time the drugs for the removal of pinworms which are receiving the most attention in Europe are largely aluminum compounds, and quite a number of proprietary products of this sort are being marketed. In connection with the oral administration of these drugs emphasis is placed on the use of an anal salve and on personal cleanliness.

Along the line of anthelmintics, it may be mentioned that in veterinary medicine arecoline hydrobromide has come into use recently as a drug for the removal of tapeworms from dogs. The drug is given in doses of one-eighth grain to small dogs and one-fourth grain to dogs of average size. The drug requires no purgative, as it is itself purgative. It sometimes leaves dogs somewhat depressed for a few hours. It appears to be quite dependable, but like any other anthelmintic will occasionally fail to remove worms. It has been reported to the writer that this drug has been given successfully to an adult person, in a dose said to be one thirty-second grain, with the subsequent passage of a tapeworm.

THE ROENTGENOLOGICAL DIAGNOSIS OF BONE TUMORS.

By R. W. HUTCHINSON, Lieutenant, Medical Corps, United States Navy.

One of the greatest aids in the diagnosis of bone tumors has been the method of analysis suggested by Dr. F. H. Baetjer, of Johns Hopkins University, and an attempt will be made in this article to follow his method of analysis in taking up different types of bone tumors.

Before discussing the analysis, there are several points to be brought to mind. First, the age of the patient is nearly always an aid in diagnosis. For example, if a patient is young, let us say 18 years, the chances are that if he has a malignant growth it will be a sarcoma rather than a carcinoma, as carcinoma is a disease of middle or old age. A malignant growth, however, in middle or old age may be either, as both sarcomata and carcinomata occur during these periods of life.

Another point to bear in mind is that of sex. In the case of a malignant growth of the pelvis, if the patient is a woman, we must consider a possible metastasis from the breast; if a man, we must consider a possible metastasis from the prostate. Another point is that cartilage, of all the constituents of bone, is highly resistant to new growth. This is manifestly important, as with cartilage at the end of all long bones we have a barrier to all primary malignant processes. Hence, lesions of the cartilage are much more likely to be due to infections or trauma than to new growth.

Method of analysis.—The first thing to determine in the case of any new growth is, if possible, its point of origin; i. e., whether the growth started in the cortex, the medulla, or the periosteum.

With the starting point established, we are able at once to rule out from our diagnosis many kinds of tumors. For example, if we are able to decide that a growth originates in the periosteum, carcinoma is ruled out. There are no epithelial cells in the periosteum, and carcinoma occurring in bone must be metastatic. Carcinoma cells lodge in the bone near the nutrient artery which brought them to the bone; consequently we must look for carcinomata near the middle of the shaft in the medulla and cortex. Sarcomata being of connective tissue origin may originate in cortex, medulla, or periosteum. Sarcomata may be metastatic, but when primary these tumors usually have their point of origin near the ends of a long bone.

The second point of analysis is whether the cortex is destroyed or not, and if it is not destroyed, whether it is expanded. Benign tumors tend to grow up and down the shaft, expanding the cortex rather than destroying it.

Malignant growths grow rapidly in all directions and tend to destroy rather than to expand the cortex slowly.

The third point of analysis is that of bone production. If new bone formation can be demonstrated in a bone tumor, many forms of malignancy can be ruled out. Carcinoma from the nature of its origin never produces new bone. Round-cell, spindle-cell, and giant-cell sarcomata do not produce new bone. This narrows the diagnosis somewhat. We have left to consider periosteal and osteosarcomata, enchondromata, osteomata, and ossifying hematomata. The manner of laying down of the new bone is of importance, since new bone in malignant disease has a tendency to be laid down perpendicular to the shaft, and in benign tumors parallel with the shaft.

The fourth point to consider is that of invasion. If it can be decided that a tumor invades the soft tissues rather than just pushing them aside, we have a very important index of the malignancy of the tumor. Infiltration and incorporation of other tissues into the new growth is one of the primary principles of malignancy. A new growth in bone, if very malignant, grows rapidly in all directions,

destroying or absorbing tissue around it. Tissues are not pushed aside and have no chance to build up a protective wall around the tumor.

Characteristics of bone tumors.—Carcinomata in relation to bone are always metastatic, and therefore usually involve more than one bone. The metastases usually reach the bones by the arteries or the lymphatics; if by the lymphatics the growth may be at the ends or the center of the shaft. Metastases are probably more common through the arterial system, and that form will be considered.¹ As the metastatic particles enter the nutrient foramen of the bone by way of the nutrient artery, the first growth is in the immediate vicinity of the artery. After being once implanted the tumor grows rapidly in all directions, destroying cortex, medulla, and invading the soft tissues surrounding the bone. There is no new bone formation. Carcinomata do not give a picture which can be differentiated from sarcomata. However, there are certain forms of carcinomata which are fairly characteristic. Metastatic carcinomata from the prostate to the pelvic bones and to the femur can usually be recognized. The bones appear to be definitely increased in density but in an irregular manner, and this apparent increase in density is much more evident than the bone destruction. Certain other forms of carcinomata, such as the metastases from the thyroid, have a similar appearance.

Metastases from carcinomata of the breasts, lungs, skin, and uterus cause destruction of bone in small discrete areas with no increase in density. Spontaneous fractures are fairly common; one case seen recently showed 27 fractures of the ribs alone.

Hypernephromata have much the same general appearance as carcinomata of the prostate. A case seen recently had an infiltration of the pelvic bones almost identical in appearance with that of carcinomata except that the increase in density was not apparent in the upper part of the bony skeleton.

A very simple method of remembering the degree of malignancy of the various kinds of sarcomata is that the malignancy varies inversely as the size of the individual cell involved, the small round-cell type being the most malignant and the giant the least. Round-cell sarcomata are very malignant, originate in the medulla, and destroy in all directions. The cortex is destroyed, not expanded. Sarcomata in many cases can not be differentiated from carcinomata

¹ Figure 1, although not a very clear reproduction, illustrates many of these points. The growth originated in either the cortex or the medulla, probably the latter. It has no well-defined boundaries, but has grown rapidly with no new bone formation, a fact which rules out many kinds of new growth, such as periosteal sarcoma, osteosarcoma, osteoma, and so forth. It is located in the middle of the shaft of a long bone suggesting a metastasis. It has invaded and not pushed aside the soft tissues. The condition was diagnosed as metastatic malignancy, probably carcinoma.

except by indirect evidence as age, sex, location; i. e., whether at the end or middle of the shaft of the bone. The round-cell sarcomata form widely spread metastases and invade the surrounding tissues early in the process.

Spindle-cell sarcomata are malignant but do not invade nor tend to destroy as rapidly as the round-cell type. However, they grow in all directions, destroying the cortex, not expanding it, and finally invade other tissues.

Periosteal sarcomata are very malignant tumors and are the most characteristic of all the sarcomata from an X-ray standpoint. They originate in the periosteum, and grow chiefly at first by invading soft tissues, with little, if any, change in appearance of the cortex. When seen early all that is apparent is a number of fine lines of calcium deposit extending out into the soft tissues from the periosteum in a radiating manner, not parallel but perpendicular, or nearly so, to the shaft. Later on the cortex is invaded and destroyed. There is new bone formation, a definite point of origin and invasion in the case of these tumors, and they usually occur in youth or early adult life.

Osteosarcomata greatly resemble periosteal sarcomata but differ in that the new bone growth in the case of the osteosarcomata is much more dense and massive and there is also a much earlier destruction of the cortex. The amount of new bone has been considered to be an index of the malignancy of the tumor. Osteosarcomata also occur in youth and early adult life. Periosteal sarcomata and osteosarcomata are the only malignant tumors producing new bone.

Giant-cell sarcomata in comparison with most of the sarcomata are benign. They grow slowly and do not have the tendency to metastasize. The rule regarding malignancy and the size of the cell holds true, as these tumors have the largest individual cell of any of the sarcomata. Giant-cell sarcomata originate in the medulla, grow in all directions, and destroy a portion of the cortex. However, they always leave a portion of the border of the cortex intact, thus giving the appearance of expansion of the shaft. The common site for these tumors is at the ends of the long bones, usually the femur or tibia. There is no new bone formation present. Giant-cell sarcomata very often have the appearance of a mass of bubbles blown in the bone; they are tumors of middle age.

Myelomata are malignant growths which grow slowly. They are characterized by multiple small focal areas of destruction underneath the cortex, which is thinned out but is always intact. These tumors are seen most commonly in the flat bones, but they are not characteristic from an X-ray standpoint. The presence of Bence-Jones bodies in the urine assists in the diagnosis.

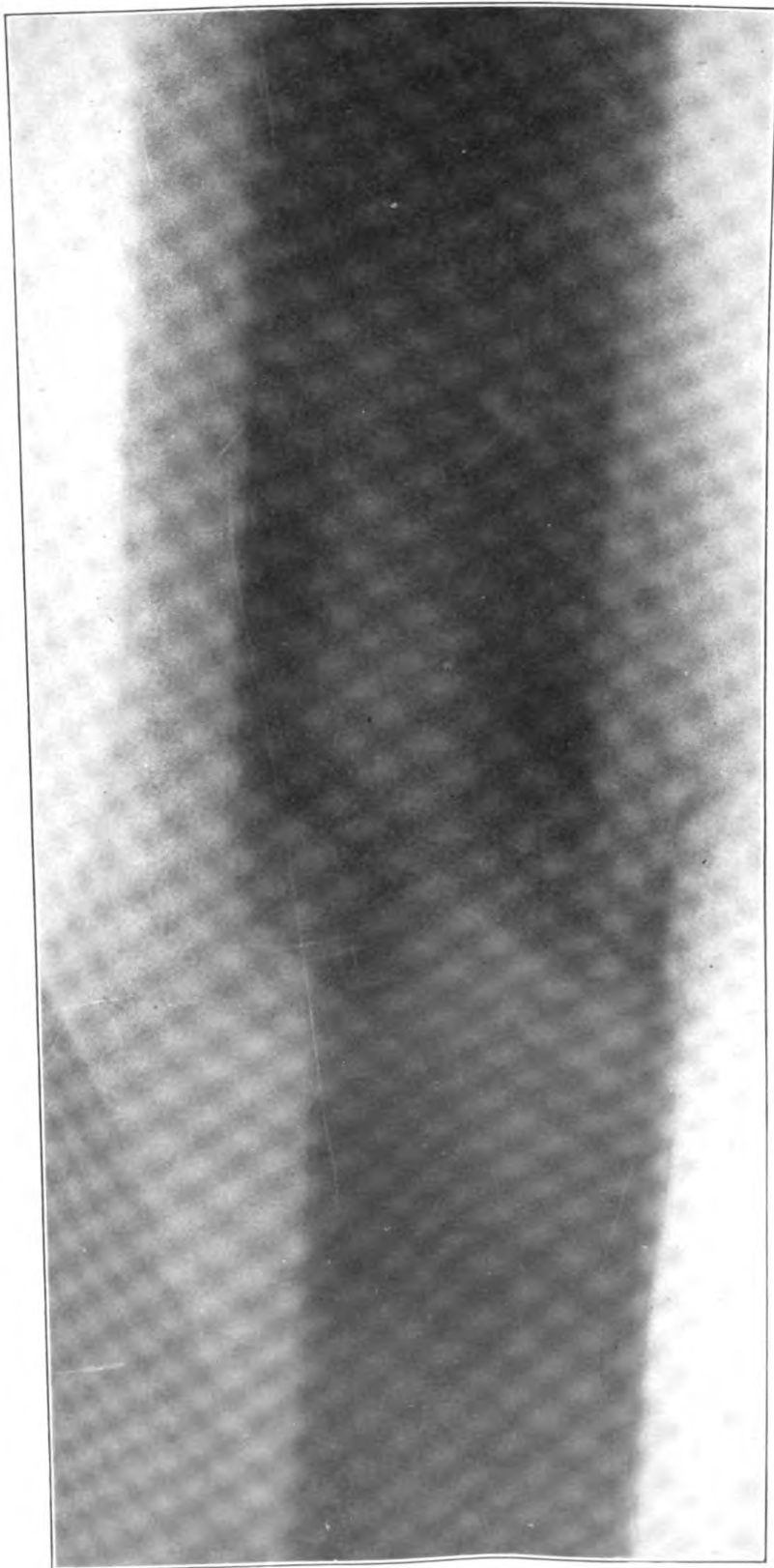


FIG. 1.—METASTATIC MALIGNANCY.

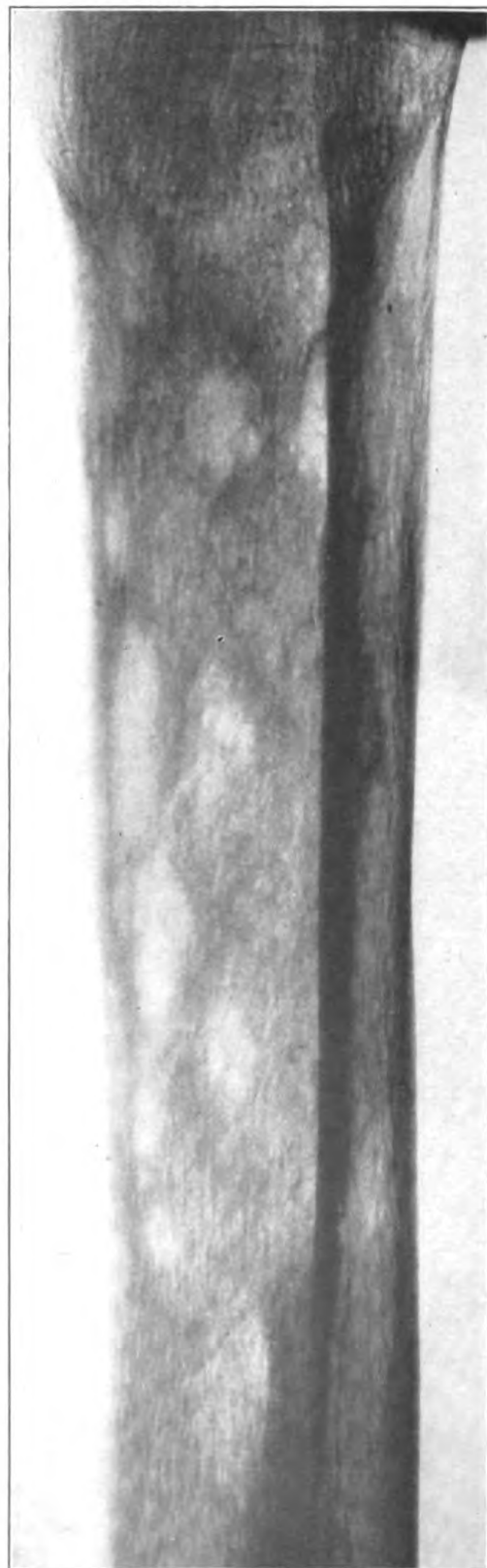


FIG. 2.—ANTERIOR VIEW OF TUMOR SHOWING CARCINOMATOUS GROWTH WITH WIDESPREAD METASTASES.

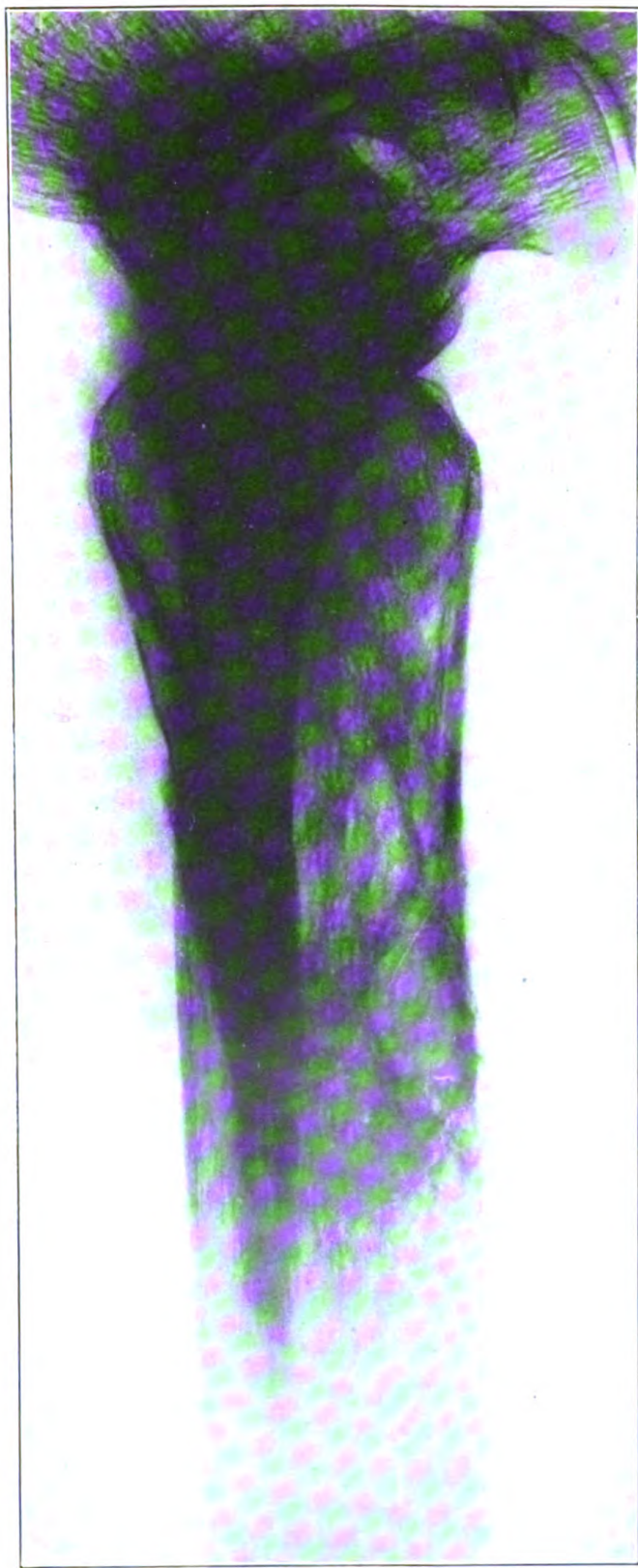


FIG. 3.—LATERAL VIEW OF TUMOR SHOWN IN FIGURE 2. NOTE MOTH-EATEN APPEARANCE. THERE IS GENERAL RAREFACTION OF THE BONE WITH SMALL AREAS OF DESTRUCTION AND NO BONE FORMATION. THIS IS CHARACTERISTIC OF WIDE-SPREAD MALIGNANCY.



FIG. 4. SARCOMA OF HEAD OF THE TIBIA IN CHILD. NOTE UNUNITED EPIPHYSES. THERE IS NO NEW BONE GROWTH PRESENT. DIAGNOSIS: EITHER ROUND OR SPINDLE CELL SARCOMA.



FIG. 5.—A VERY ACTIVE AND MALIGNANT TUMOR OF THE PROXIMAL END OF THE SHAFT OF THE TIBIA. THE NEW GROWTH HAS DESTROYED A SECTION OF THE CORTEX WITHOUT NEW BONE FORMATION. THIS IS AN EXAMPLE OF SMALL ROUND CELL SARCOMA PRIMARY IN THE BONE.



FIG. 6.—PERIOSTEAL SARCOMA. THERE IS NO EVIDENCE OF DESTRUCTION OF EITHER MEDULLA OR CORTEX. THE PROCESS IS INDICATED ENTIRELY BY THE PERIOSTEAL NEW GROWTH RADIATING FROM THE SHAFT IN FINE LINES PERPENDICULAR TO THE SHAFT. THESE TUMORS ARE USUALLY MORE ADVANCED THAN IS APPARENT FROM THE X-RAY EXAMINATION.

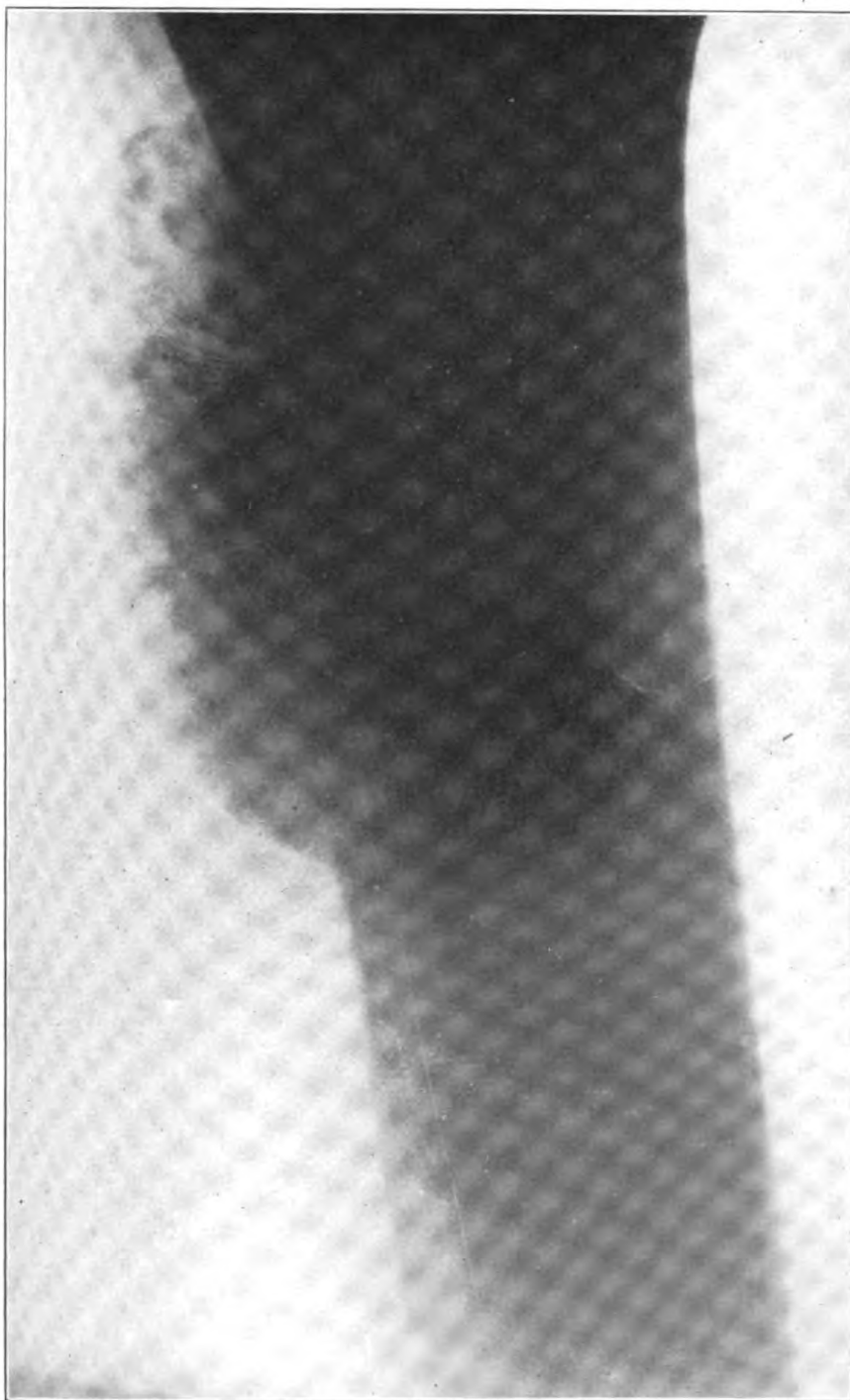


FIG. 7.—OSTEOSARCOMA. THERE IS CONSIDERABLE NEW BONY GROWTH EXTENDING INTO THE SOFT TISSUES. THE TUMOR INVOLVES THE CORTEX AND THERE IS SOME BONE DESTRUCTION. NOTE THE NEW BONE FORMATION AT RIGHT ANGLES TO THE SHAFT.



FIG. 8.—OSTEOSARCOMA SHOWING DESTRUCTIVE PROCESS AND NEW BONE FORMATION.

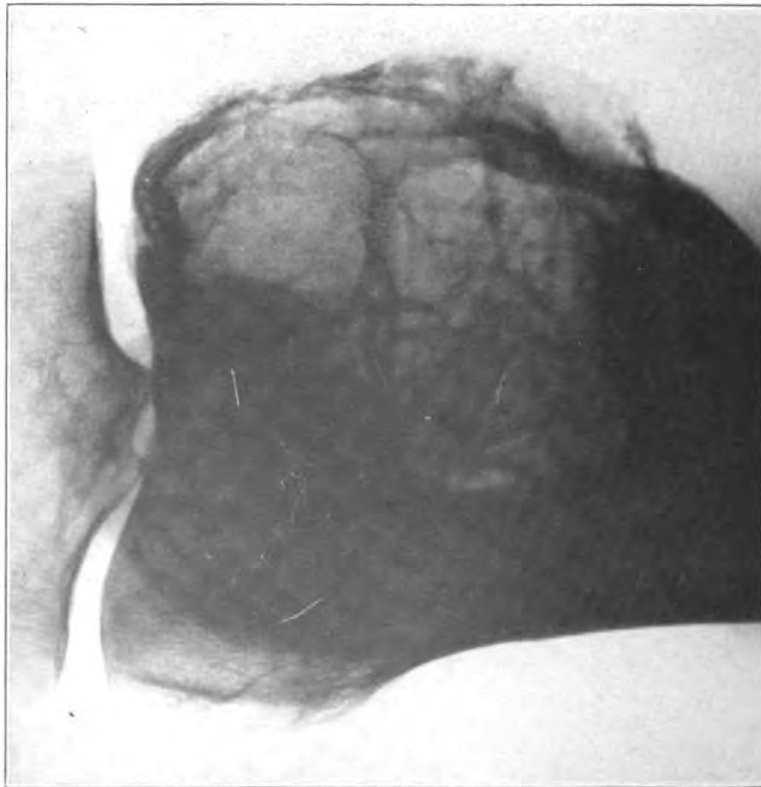


FIG. 9.—GIANT CELL SARCOMA. MUCH OF THE MEDULLA HAS BEEN DESTROYED AND THE CORTEX HAS BECOME THIN BUT IT IS INTACT.



FIG. 10.—ENCHONDROMA OF TERMINAL PHALANX. NOTE THINNING OF CORTEX.

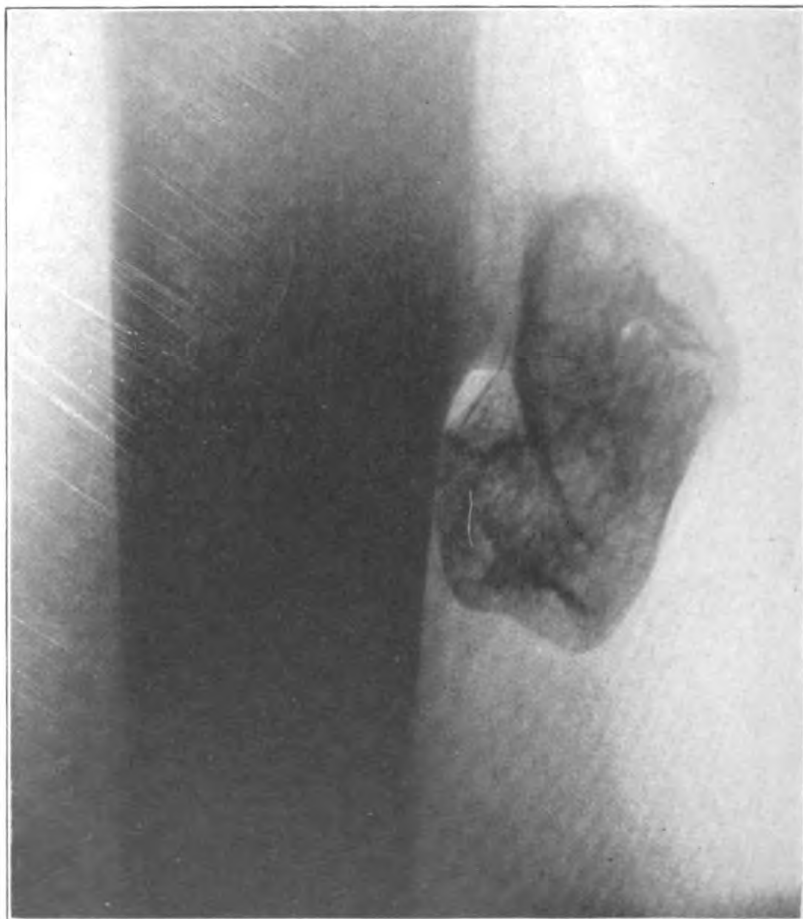


FIG. 11.—OSTEOMA OF THE LOWER END OF THE FEMUR.
OBSERVE THE CAULIFLOWER APPEARANCE OF THE GROWTH
WHICH IS DEFINITELY LIMITED AND DOES NOT INVADE
THE SOFT TISSUES.

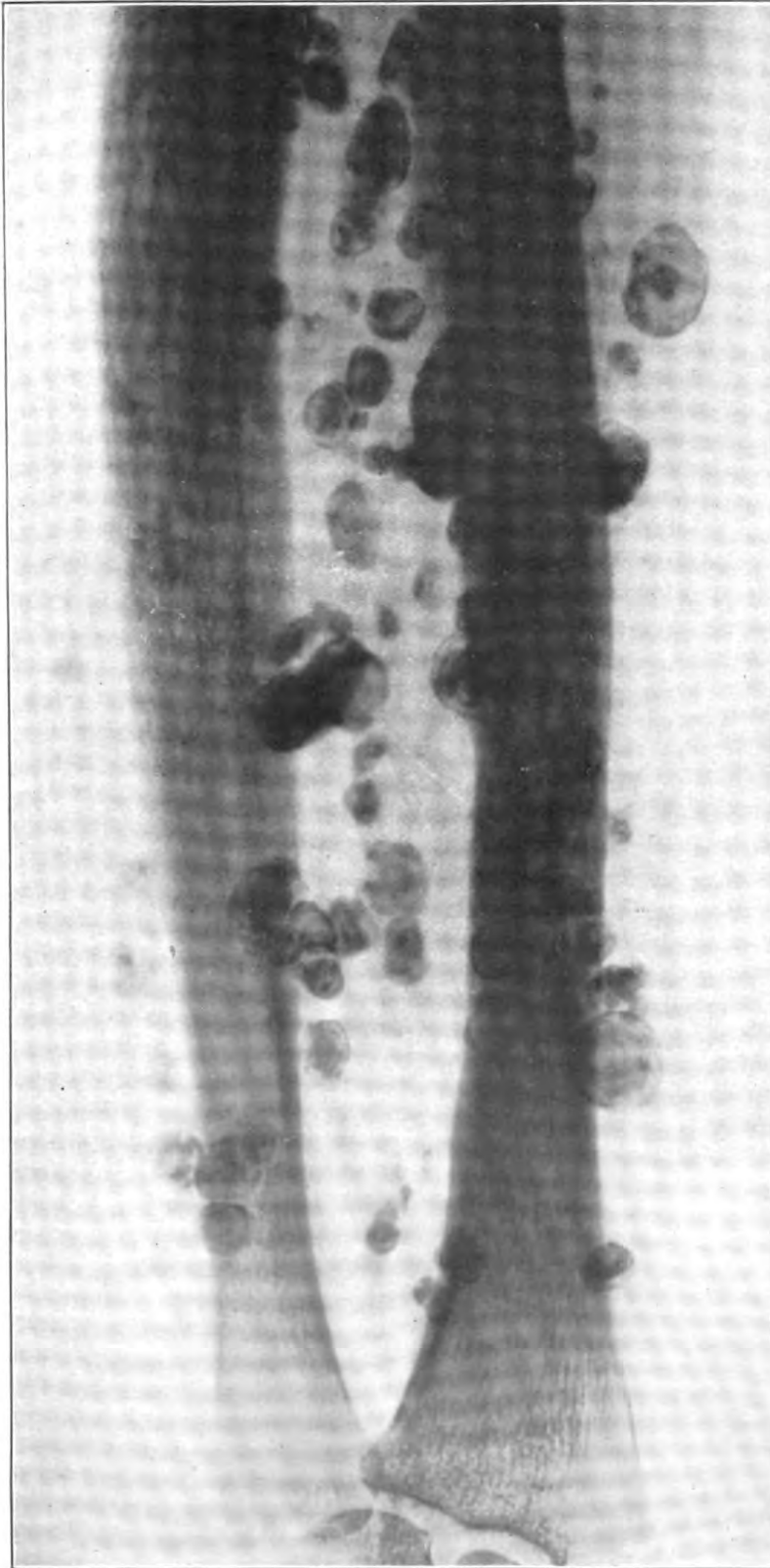


FIG. 12.—HEMANGIOMATA SHOWING THE ROUND AREAS OF CALCIFICATION OCCURRING IN THE SOFT TISSUE TUMOR.

Myxomata are rare tumors with an appearance resembling that of bone cysts. They occur in youth and may become malignant.

Enchondromata and osteochondromata are in one case entirely, and in the other partially, cartilaginous in origin. They occur usually very early in life. They originate in the medulla near, but not in, the epiphyses and expand but do not destroy the cortex. The popular theory regarding these tumors is that their growth is from cartilaginous rests; i. e., bits of cartilage that did not undergo calcification into bone and were left behind in the building up of the bony skeleton. These, from some cause, proliferate later in life and grow into cystlike formations, often loculated. They always have a definite border and do not invade surrounding tissues. Enchondromata are sometimes multiple, especially when seen in the bones of the hands. Other tumors involving the hands are relatively uncommon with the exception of cysts.

Osteomata are benign tumors growing from the cortex and resembling normal bone in structure. They have a cauliflowerlike appearance and clean-cut definite borders. They do not invade but push aside soft tissues. Osteomata are painless, but mechanically interfere with motion. If removed, they do not usually recur. They usually grow during youth, and their favorite point of origin is at the lower end of the femur just above the epiphysis. Exostoses originate from the cortex and grow outward, pushing aside soft tissues. There are two common varieties, one spurlike in shape and the other a broad wartlike growth. They occur near joints, and usually point away from the nearest one. A condition is sometimes found of multiple exostoses associated with defective development of the epiphyses probably congenital in origin. There is considerable deformity present in this condition.

Bone cysts are usually classified among bone tumors. They resemble very much the enchondromata. Bone cysts originate in the medulla, expand, but do not destroy the cortex. Their common appearance is that of oval or round empty spaces in the bone as if a small portion of the medulla and cortex had been scooped out. Very often the first evidence of a bone cyst is manifested by a fracture through the cyst. Bone cysts are usually single, but may be multiple. It is this characteristic that usually differentiates them from enchondromata.

Fibromata need only be mentioned, as they are rare tumors. They resemble bone cysts and enchondromata in that they originate in the medulla and thin but do not destroy the cortex. They are not invasive and contain no new bone. They can not be differentiated from bone cysts and enchondromata by the X ray.

Hemangiomata are not, strictly speaking, bone tumors, but should be mentioned on account of their peculiar and striking appearance. They consist of large, rounded, soft, tissue swellings, which may be demonstrated by the X ray. Scattered throughout these swellings are round or oval bodies of calcification, sometimes laid down in concentric rings. Their appearance is most unusual and once seen will not be forgotten. This condition has been considered at times to be trichinosis with calcification of the cysts.

Ossifying hematmata are mentioned merely to prevent their confusion with bone tumors, and especially with periosteal sarcomata and osteosarcomata. The condition is commonly seen in cases of scurvy in children, in whom the periosteum easily strips off from the cortex, allowing the resulting space to be filled up with blood clot. In adults a sharp trauma may often cause a localized hematoma either near or under a local area of periosteum. This hematoma either is absorbed or organizes after several weeks. Calcium is laid down in layers parallel to the shaft as compared to the calcium deposit in periosteal and osteosarcomata, which is perpendicular to the shaft. The periosteum always forms a sharply limiting membrane in these cases, thus demonstrating the malignancy.

Tumors of the skull are very hard to diagnose, and many of them give no evidence whatever from an X-ray standpoint. The reason for this is obvious. First, the skull being composed of flat and irregular bones, the method of analysis used in long bones does not apply, for we have no sharp differentiation into medulla and cortex. Secondly, the multiplicity of shadows superimposed as in the case of the face render a careful examination for a new growth very difficult. Tumors of the hypophysis are fairly characteristic, however. They either expand or more or less completely destroy the sella turcica with or without evidence of intracranial pressure on the bones of the cranium. Of course, any condition causing a great increase in intracranial pressure may bring about this change. The cranial bones become very thin and the convolutions of the brain appear to be marked out on the inner surface of the skull. Metastatic growths in the cranial bones produce a moth-eaten appearance much like that seen in metastatic growths of the flat bones. When the areas of destruction are clean-cut or punched-out in appearance, a luetic infection should be considered, especially if the involvement is chiefly of the outer table of the bone.

Conclusions.—All cases in which a bone tumor is suspected should be studied in an analytical manner. Several points are of value as aides in diagnosis, such as the age and sex of the patient and the fact that cartilage is highly resistant to new growth and acts as a barrier limiting malignant growth.

In deciding the type of tumor and its degree of malignancy the following should be considered: The point of origin of the tumor, the condition of the cortex, the question of whether there is new bone production in the tumor, and whether the tumor invades or pushes aside surrounding soft tissues. This last point is probably the most important of all, as it determines the malignancy of the tumor. Usually not all these points can be determined in any one case, but if several of them can be demonstrated a diagnosis is possible.

HOOKWORM STUDIES IN AMERICAN SAMOA.

By DANIEL HUNT, Lieutenant Commander, and A. L. JOHNSON, Lieutenant, Medical Corps, United States Navy.

There is no record of hookworm disease existing in American Samoa prior to 1908, at which time Rossiter reported that hookworm infection was prevalent throughout the Samoan Islands. Between the years 1908 and 1921 the annual sanitary reports show that 1,066 cases were treated for hookworm. An idea of the severity of the infection can be gained from the fact that there are cases on record in which 200 or more worms were recovered; in one case the adult worms totaled over 3,000. It has been stated that over 90 per cent of the people of American Samoa were infected with hookworm. This statement was based on an examination of 305 natives, in 1911, which showed 275, or 90 per cent to be infected.

In order to determine the prevalence of intestinal parasites an examination of the stools of 1,200 natives from all parts of the islands was made; 87.6 per cent were positive for intestinal parasites; hookworm varied from 8 to 78 per cent, according to the soil and general sanitary condition of the locality; 59.6 per cent showed ascaris and 58.8 per cent showed trichuris. In view of the fact that 87.6 per cent of the stools were positive for intestinal parasites it was deemed advisable to treat all natives. Oil of chenopodium, being recognized as the best drug for all intestinal parasites, was decided upon. However, this drug was not available for immediate use, and rather than lose time, thymol or calomel and santonin were used as indicated. Eight hundred and sixty-four cases were treated with thymol. Upon receipt of a supply of oil of chenopodium a village-to-village campaign was instituted, and 4,907 natives have been treated up to date (September, 1922). Two hundred and seventy-nine were given carbon tetrachloride in order to compare the three methods of treatment.

For the purpose of making an accurate study of hookworm infection in American Samoa small groups were selected for observation.

A preliminary examination of stool was made in every case. If no ova of hookworm were found in the smear, three or more, sometimes seven, different methods of examination were employed. Salt flotation or strong brine was employed in every case where the smear was negative. Regardless of the laboratory report, the individual received treatment and all stools passed for the first 24 to 48 hours were examined separately for adult worms. One to two weeks later a specimen of stool was reexamined.

When thymol was used the average dose for an adult was 60 grains, divided into three equal amounts and given at hourly intervals. This was preceded and followed by saline purge. No treatment was given unless the bowels had freely moved from the first purge. As high as 90 grains were given without any untoward effects, and in no case was stimulation necessary. One week after treatment the patient returned and was given another course of thymol regardless of laboratory findings. If the stool was still positive, the following week thymol was again administered. When oil of chenopodium was used the average dose for an adult was 45 drops, divided into three equal amounts, given at hourly intervals, and followed an hour later by castor oil. No preliminary purge was given. As high as 60 drops were used without any toxic symptoms. In the cases studied two treatments were given one week apart. In normally developed children two drops were used for each year of age. When carbon tetrachloride was used the dose was always 3 c. c. The entire single dose was given in the early morning on an empty stomach, without any untoward effects. Catharsis was not employed either before or after its administration. No breakfast was allowed on the morning of treatment. With this exception, there was no interference with the daily routine.

The examination of 1,000 hookworms recovered from 50 cases showed in every instance *Necator americanus*, 780 females and 220 males. Examination of 50 pigs in different localities showed 100 per cent positive for intestinal parasites, 66 per cent for hookworm. A hookworm which could not be identified was recovered and sent to the Naval Medical School. This hookworm, recovered from the pig, was never found in man, nor did we ever find *Necator americanus* in the pig.

One hundred natives who had never received treatment, and who came from a locality suspected of being heavily infected, were selected and their stools examined by Willis salt-flotation method. Seventy-eight per cent were positive for *Necator americanus*. At the beginning of our studies 24 per cent of all examined, without regard to previous treatment, were positive for this parasite. While thymol was being given 575 were examined and the incidence of hookworm infection was found to be 14 per cent. During the use of oil of

chenopodium 317 were examined, 12 per cent being positive. A recent survey shows the incidence of hookworm infection in American Samoa to be down to 8 per cent.

In a study of 100 cases of hookworm infection that received thymol treatment, 86 per cent remained negative after treatment and 14 per cent remained positive. Of the 100 patients receiving oil of chenopodium, 94 per cent remained negative after treatment and 6 per cent were still positive. Of 100 patients who received a single treatment of carbon tetrachloride, 99 per cent remained negative after treatment and 1 per cent positive. In one case positive before treatment and negative one week after treatment there were only three worms (one male and two females) collected within 24 hours following carbon tetrachloride.

Another group studied were those whose stools were negative for hookworm prior to treatment; 17 per cent of these passed adult hookworms as a result of a single dose of carbon tetrachloride. The number of worms varied from 1 to 17. In the case of the 17 worms passed, 11 were females and 6 were males.

Thymol is of little or no value in the treatment of ascariasis or trichuriasis. Of 200 cases positive for *A. lumbricoides* and *T. trichiura*, 100 were treated with carbon tetrachloride and 100 with oil of chenopodium. Two weeks later they were reexamined and all still found to be positive for *T. trichiura*. Of those treated with carbon tetrachloride, 24 per cent passed ascarides, 18 per cent had negative stools two weeks later, the remaining 82 per cent were still positive for *A. lumbricoides*. Of those treated with oil of chenopodium, 60 per cent passed ascarides. Upon examination of the stools a week or so later only 33 per cent were found to be negative. In one case a five-year old child was given 15 drops of oil of chenopodium, and 25 adult ascarides were passed and the stool was negative one week later. Another five-year old child, positive for *A. lumbricoides*, was given 10 drops of oil of chenopodium and passed no worms, and the stool remained positive. Another case of an adult who received 40 drops passed no worms and one week later the stool was positive for *A. lumbricoides*, *N. americanus*, and *T. trichiura*. While these are isolated cases, they support our belief that with oil of chenopodium either large doses or persistent treatment are necessary.

Reinfection undoubtedly occurs oftener than is usually suspected. Over 100 of our cases, supposedly cured by oil of chenopodium, were examined from six months to a year later and 24 per cent found infected with hookworm. Typical ground itch is rarely seen, and it is our belief that reinfection often occurs without this classical symptom.

As a prophylactic measure it is planned to treat all natives each year. Further prophylaxis is maintained by requiring all pigs to be penned at a safe distance from living quarters. Latrines are established in all villages. Pit latrines have not proven satisfactory and are rapidly being replaced by beach or septic tank latrines, these types being favorable to the rapid destruction of hookworm ova.

In American Samoa hookworm infection is prevalent, mild hookworm disease is not uncommon, severe hookworm disease is rare. Blood findings alone have been sufficient to warrant this statement, Severe symptoms have only been observed in the presence of intercurrent diseases, and because of this fact hookworm infection is a menace to the health and development of the Samoan people.

PULMONARY SYMPTOMS INCIDENT TO INFECTION OF THE ACCESSORY SINUSES OF THE NOSE.¹

By R. T. McINTIRE, Lieutenant, Medical Corps, United States Navy.

During the past few years great advance has been made in the diagnosis of the disease of the nasal accessory sinuses. With the advanced methods of diagnosis many chronic infections, especially of the posterior group, have been detected, and systemic conditions of various sorts have been cleared up by elimination of the focus in the sinus.

This paper is a report of a series of 37 cases which presented pulmonary manifestations incident to infection of the nasal sinuses. It is the result of systematized group work conducted at this hospital. In the general routine of the hospital all cases with indefinite lung conditions are subjected to a thorough examination of the entire respiratory tract and the sinuses for sites of foci of infection.

The cases observed have presented constitutional symptoms so like those presented in pulmonary tuberculosis as to make diagnosis most difficult. The most careful study of physical signs is required to determine the true character of the infection. The X ray has been of the greatest assistance in the study of these cases. Even here we find a striking parallel which requires the most accurate differentiation in arriving at a diagnosis. Some of the cases have shown the typical febrile remissions so characteristic of pulmonary tuberculosis; there was loss of weight, general weakness, and persistent cough, which was quite productive. Night sweats were present in several patients. Three cases had the flushing of the face so often seen in tuberculosis. The physical signs were even more confusing. In some of the cases there was complete absence of physical signs

¹ Paper read at staff conference, United States Naval Hospital, San Diego, Calif., Dec. 6, 1922.

with the exception of slight dullness over the apices. In the majority of cases hyperresonance and sibilant râles were heard over the entire chest. Not infrequently crepitant râles which did not disappear following cough have been elicited over both apices.

X-ray findings.—Cases of this sort usually present two distinct pictures, but it is only on rare occasions that a patient has a chest picture that is a true composite of both types. The most common picture is that of a thickening and haziness of the bronchial shadows from the hilus to the base on the right side. There is an infiltration in this area that varies from a slight density to the shadow of complete consolidation. Occasionally there are small areas of marked density about 1 c. m. in diameter that represent small discrete consolidations. The hilus glands are enlarged and show varying degrees of density. No calcareous deposits have been noted as yet in this type of case. In the parenchyma about the glands there is a density that is typical. The whole hilus area casts a dense shadow through which the glands may be seen, and this shadow extends well into the lung tissue. Its margin is poorly defined and rough. This type is probably due to a direct drainage of infectious secretions from the nose and throat down the right bronchus into the right base. Not infrequently this same process is noted on the left side and is due to the fact that drainage also occurs on that side. In a comparatively short while after the pathological conditions in the nose and throat have been cleared up this picture rapidly changes to one of normal aspect.

The other type of case is that in which this process involves the upper lobes, and a density is shown along the mediastinum on both sides. These shadows extend outward and not infrequently cause a density that resembles a consolidation. The bronchioles and lymphatics are dense and fuzzy in outline. When this condition exists, moist and sibilant râles may be heard, and increased tactile fremitus and whispered voice sounds are noted. The picture is one of infiltration of the upper lobes, and except for the mottling and beading common in tuberculosis it resembles this condition. It clears up rapidly after the nose and throat symptoms have disappeared. Rarely a composite picture of the two types is seen. Here both the apices, upper lobes, and the bases are involved in diffuse bronchial thickening with a density throughout the surrounding parenchyma that represents more or less infiltration. Occasionally there are small areas of density in a background of lesser density that are evidently small abscesses or dilated bronchioles. A patient presenting this picture is usually considered to be suffering from diffuse bronchitis with areas of bronchiectasis. The condition in the chest does not resolve so quickly, and the small abscesses or dilated bronchioles cast shadows for weeks after the nose and throat conditions have

been cleared up. The ultimate results, however, are always good. The outstanding features of these chest conditions secondary to nose and throat infections are the apparent chronicity, the lack of calcareous deposits in the lung tissue or hilus glands, the rapidity with which they clear up under proper treatment, and the little residue that is left after resolution has occurred. A chest that resembles tuberculosis clinically and roentgenologically will show after a few weeks of treatment no pathology whatever.

The sinuses most often the foci of infection are the ethmoid and sphenoid. In this series they were infected in 79 per cent of the cases. The most common form of sinusitis was the hyperplastic type with discharge. In 24 cases no symptoms other than pulmonary were evident. In 8 cases typical headaches of the ethmoid type were present. In 5 cases the typical sphenoidal syndrome described by Sluder was present.

The sequelæ of this pulmonary condition is bronchiectasis, which is more to be dreaded than pulmonary tuberculosis. Two cases of bronchiectasis have been observed by the writer, and one such case is under observation at present. It is my intention to report in detail 7 cases from the 37 of our series.

Case 1.—Admitted September 5, 1922. Diagnosis undetermined. Pulmonary tuberculosis suspected.

Complaint: Loss of weight, lassitude, night sweats, low-grade temperature, pain in chest of indefinite nature, and cough.

Examination: Under weight. Chest—Crepitant râles in both apices, increased vocal resonance over right apex. Temperature—Low grade; evening rise to 99.2° F. Abdomen—Negative. Sinuses—Definite infection of right frontal and right maxillary sinuses and right ethmoids; other sinuses negative. X-ray examination of chest shows some density and mottling of both apices; the left base was infiltrated, right base peribronchial thickening and infiltration; X ray of sinuses confirmed physical findings. Sputum negative for tuberculosis. White-blood count, 19,000. Wassermann negative.

September 9, 1922: Diagnosis changed to bronchitis, chronic; treatment instituted for sinusitis. September 23, 1922: Patient gained 3 pounds; temperature normal. November 15, 1922: Patient generally improved; has gained 11 pounds; sinuses much clearer; X ray shows apices clear; there is still some infiltration of the left base; no râles present; temperature remains normal; cough gone.

Case 2.—Admitted August 18, 1922. Diagnosis: Tuberculosis, pulmonary.

Complaint: Cough, profuse expectoration, headaches of parietal type; loss of weight and marked weakness; low-grade temperature; malaria in 1910.

Present illness: Severe cold in January, 1922, which was followed by a persistent cough with much expectoration.

Examination: Fairly well-nourished man; slight puffiness under eyes. Chest—Sibilant râles over apices, hyperresonance present. Heart and abdomen negative. Sinuses—Hyperplastic ethmoiditis and sphenoiditis with muco-purulent discharge; right maxillary sinus infected. Throat and teeth negative. Urine negative. Wassermann negative. Sputum negative for tuberculosis. White-blood count 9,500. X-ray examination of chest—Small areas of cloudiness in both apices; peribronchial thickening and infiltration of both bases; sinuses confirm physical findings. The temperature in the case was quite typical of tuberculosis, having an evening rise from 99° to 99.4° F. Treatment instituted for sinusitis.

October 17, 1922: Patient feels better than at any time in two years; gained 9 pounds in weight; sinuses clearing rapidly; very slight nasal discharge; cough much less, with very slight expectoration; sputum remains negative for tuberculosis; X-ray examination of chest shows marked improvement, especially at the bases. November 1, 1922: Diagnosis changed to ethmoidal sinusitis. November 17, 1922: Discharged to duty; has had no symptoms in weeks; X-ray examination shows sinuses in good condition and chest cleared up to a marked extent; examination of the chest shows all râles to have disappeared; the cough gone.

Case 3.—Admitted September 23, 1922. Diagnosis undetermined. Suspect tuberculosis.

Symptoms: Cough, pains in chest, loss of weight, occasional night sweat, general malaise and headache.

Examination: Well developed. Chest—Slight dullness over both apices; increased breath sounds over right upper lobe; hyperresonance over both bases; sibilant râles over both. Heart and abdomen negative. Sinuses—Definite ethmoidal and sphenoidal involvement with muco-purulent discharge. Urine negative. Sputum negative for tuberculosis. White-blood count 10,500. Wassermann negative. X-ray examination of chest—Indefinite shadows in right apex; peribronchial thickening and infiltration of both bases. X-ray examination of sinuses shows definite cloudiness of ethmoids and sphenoids. Placed on treatment for sinusitis.

October 21, 1922: Diagnosis of ethmoidal sinusitis made; patient has gained 9 pounds in weight; postnasal discharge much less; temperature has been normal for two weeks; has no night sweats; cough much improved; pain gone; the headaches, which were of the typical ethmoidal-sphenoidal type, have disappeared. November 14, 1922: Discharged to duty well; sinuses clear; chest clear.

Case 4.—Admitted May 24, 1922. Diagnosis undetermined. Tuberculosis suspected.

Present illness: Loss of weight during the past eight months; complains of general weakness, severe pains in parietal regions, and general pain in chest; cough, which is productive; runs a low-grade temperature, with evening rise.

Examination: Chest—Sibilant râles over both lungs; hyperresonance over right apex and back. Heart negative. Abdomen negative. Sinuses—Ethmoids and sphenoids infected, purulent discharge; other sinuses clear. X-ray examination—Upper lobes slightly hazy at the apices; heavy hilus shadows, both bases infiltrated; sinuses, ethmoids, and sphenoids cloudy. White-blood count, 9,200. Treatment instituted for sinusitis. Diagnosis changed to sinusitis ethmoidal. June 15, 1922, much improvement; temperature normal; postnasal discharge much less. November 15, 1922: Patient is now normal in weight; sinus condition has cleared up; X ray shows upper lobes clear; left base practically cleared; marked improvement in the right base.

Case 5.—Admitted July 22, 1922. Diagnosis undetermined. Tuberculosis suspected.

Chronic bronchitis at Great Lakes in 1919; complains of loss of weight, 14 pounds in a month; cough, night sweats, general weakness.

Examination: Crepitant râles and increased vocal fremitus, both apices; increased tactile fremitus, right apex; heart negative; abdomen negative. Sinuses—Right antrum infected; hyperplastic involvement of both ethmoids and sphenoid. X-ray examination—Right antrum cloudy, indefinite condition of ethmoids. Treatment instituted for sinusitis. X-ray of chest—Dense infiltration of both bases, especially the right; haziness of both apices; dense shadows about hilus of each lung. Sputum negative for tuberculosis. White-blood count, 6,500.

November 15, 1922: Symptoms have cleared up; cough gone; sinuses clear; chest cleared to great extent; general physical condition improved.

Case 6.—Admitted June 14, 1922. Diagnosis undetermined. Tuberculosis suspected. Has had a postnasal discharge for the past eight years.

Patient well developed, somewhat under weight.

Symptoms: General weakness, cough, temperature which ranges to 100° F. each evening, night sweats, pulse 80 to 90.

Examination: Sibilant râles over both lungs, increased vocal fremitus over right upper lobe. Sinuses—Hyperplastic sinusitis, ethmoids, and sphenoids, with serous discharge. Throat negative. Heart negative. Abdomen negative. X-ray examination of chest—Apices clear, peribronchial thickening and infiltration of right base, large hazy hilus shadows both sides; sinuses, general hyperplasti:

condition of ethmoids and sphenoid. White-blood count, 9,200. Wassermann negative. Treatment for sinusitis instituted.

August 30, 1922: Discharged to duty well; temperature disappeared after three days' active treatment; chest clear. This case was undoubtedly one caused by direct infection from the sinuses.

Case 7.—Symptoms: Loss of weight, lassitude, cough; temperature, evening rise to 99.6° ; postnasal discharge.

Examination: Chest—Moist râles over both apices, sibilant râles over both bases, hyperresonance over right scapular region. Sinuses—Suppurative ethmoiditis, anterior group clear. Heart negative. Abdomen negative. X-ray examination of chest—Both apices show some fibrosis; there is some clouding of both upper lobes; there is marked peribronchial thickening and infiltration of the right base; there is some infiltration of the left base; sinuses, ethmoids, and sphenoid cloudy. White-blood count, 12,300. Treatment for sinusitis instituted.

July 1, 1922: Greatly improved; temperature has been normal for two weeks; gaining in weight. October 1, 1922: Patient steadily improving; postnasal discharge practically ceased. November 15, 1922: Patient has practically regained perfect health; chest has cleared up, râles gone; old fibrosis in upper lobes remains.

Conclusions.—Though this series is not large, it is believed to be of definite value in showing that:

- (a) A definite pulmonary infection may result from sinus disease.
- (b) The symptoms manifested closely resemble those of pulmonary tuberculosis.
- (c) The most careful study of the physical findings are necessary.
- (d) The X-ray examination is of the greatest assistance in the diagnosis, for upon it one must depend for the differentiation between the tubercular chest and the so-called sinus chest.
- (e) There are two paths of infection of the lungs, namely, direct infection by drainage from the infected sinus, and infection of the upper lobes through the lymph channels.
- (f) All cases of indefinite lung involvement should be subjected to a thorough examination of the upper respiratory tract and sinuses for foci of infection.
- (g) Sinus infection may be a predisposing cause to pulmonary tuberculosis.

LOCAL ANESTHESIA.

By O. D. KING, Lieutenant, Medical Corps, United States Navy.

Since the introduction of the use of novocain and adrenalin the field of local anesthesia has been greatly expanded and a stage of development has been reached, by a perfected technic, which allows

a large amount of major surgery to be successfully performed with the aid of these agents. Their usefulness and advantage are generally recognized in civil practice, and without claiming that the method of local anesthesia displaces general anesthesia it certainly must be admitted that it is a permanent and valuable asset to surgery. For the naval surgeon to fail to recognize this fact and to remain content to use local anesthesia for minor operations only means that he fails to utilize the chief advantages offered by the method. With a moderate amount of training and endeavor on his part he can develop a technic which will enable him to perform a large percentage of his operations satisfactorily with local anesthetics.

Aside from the usual indications of local anesthesia, which are too well known to enumerate, there are certain conditions peculiar to the Navy which make the method of especial advantage in naval surgery.

(1) A large percentage of our operations are the type most easily and satisfactorily performed under local anesthesia.

(2) The average naval personnel has a phlegmatic disposition constituting the "ideal" patient.

(3) Conditions of the service often deprive the surgeon of an expert anesthetist.

(4) Less nursing is required and more operative work can be accomplished with a smaller personnel.

(5) There is ample minor surgery to afford the experience necessary for handling the more difficult cases.

Without going into the question of technic I will enumerate the types of operations performed with local anesthesia at the United States Naval Hospital, New York, and the types best suited to its use. Of course certain operations are easier to perform and more satisfactory than others; local anesthesia is definitely indicated in some, while in others it has no particular advantage.

Our series of 443 operations performed under local anesthesia, which is 46 per cent of the total (963) number of operations listed by the surgical section between January 1, 1921, and January 1, 1923, is representative of the usual run of operations in the Navy. The series includes a fair number of appendectomies, herniotomies, thoracotomies, thyroidectomies, cholecystotomies, amputations, complete block dissections of the neck for the removal of tuberculous glands, open reductions of fractures, and hemorrhoids. These operations were successfully performed, each as radical as the condition demanded, with so little pain that the patient invariably approved of the method and recommended it to others awaiting operation. The cases in which a combined anesthesia was used were listed as having been performed under general anesthesia.

The operation for hernia, which alone constituted 20 per cent of our operations, is ideally suited to local anesthesia. It can be performed absolutely without pain and more satisfactorily than under general anesthesia. Of 199 herniotomies, 65 per cent were performed under local anesthesia. At the present time, however, we are using the local method in all herniotomies.

Thoracotomy is also performed with local anesthesia in all cases. This operation is easy to perform under a local anesthetic; furthermore, in acute empyema a general anesthetic often is contraindicated.

A complete block dissection of the neck requires a good deal of time, and often the patient becomes restless. It can, however, be very satisfactorily performed and a cleaner and sharper dissection permitted by the use of the local method.

Exophthalmic goiters are also favorable to local anesthesia, and five of our seven thyroidectomies were performed satisfactorily with the local technic.

Abdominal operations are not so generally satisfactory. A considerable amount of exploration is often required and a great amount of manipulation and retraction is necessary. For such cases general anesthesia is better. The local technic will permit a certain amount of exploration, but for success this feature has to be reduced to a minimum and the sense of sight has to be relied upon for locating and determining pathological conditions more than the sense of touch. There are, however, certain abdominal operations which are very favorable to local anesthesia and in which it is a decided advantage. The abdomen can be opened painlessly and the surgeon given an opportunity to look inside. The operation then can either be continued under the local anesthesia or, if necessary, a combined anesthetic can be given. In this way the amount of general anesthesia is reduced—an important feature in critical cases.

There are two types of appendicitis in which local anesthesia is advantageous. First, the typical acutely inflamed, unruptured appendix, and, secondly, the chronic type for which an interval operation is indicated. In both of these types the surgeon desires to remove the appendix in the simplest way possible and he does not desire to explore the abdomen. Either the low right rectus incision or a muscle-splitting incision can be used and in about 70 per cent of such cases the appendix can be removed very satisfactorily. In 30 per cent of these cases the appendix is inaccessible and can not be delivered without painful manipulation; for such cases it is necessary to use the combined method. Gas oxygen is the best anesthetic to use in combination with the local method when a short combined anesthetic is desired. However, if ether is used the amount required is usually so small the patient reacts before the operation is completed and does not suffer with nausea. It has been our custom to use a muscle-

splitting incision well outside of McBurney's point for the usual appendectomy. If the surgeon desires to explore the abdomen under local anesthesia, he must use the right rectus incision and inject the mesenteric ganglion. In the indefinite, chronic case a general anesthetic is better. A larger percentage of interval cases can be accomplished with local anesthesia than is possible in acute cases. Thirty per cent of our total number of appendectomies were performed with local technic. The method is of particular advantage in appendicitis during periods of epidemic influenza.

Whether or not an operation can be performed with local anesthesia depends more upon the type of operation than upon the extent of operative interference. Certain specialists profess to be able to perform all operations with local anesthesia, but this degree of perfection is not the rule. The principles of the technic require a clean-cut, sharp dissection with a minimum amount of rough manipulation and trauma; blunt dissection and tearing of tissues will not be tolerated by the patient. These principles and limitations must be appreciated and the operating technic so modified that the operation can be performed without overstepping the prescribed bounds, but it does not mean that the extent of operation required by the condition can not be carried out.

In order to obtain satisfactory results, analgesia must be complete and the confidence of the patient maintained. Once he is hurt, he never quite regains an unstrained attitude, and, although he will tolerate a considerable amount of pain, he will not speak well of the performance afterwards. His cooperation is necessary, and the surgeon will do well to pay attention to his complaint and relieve the fault, rather than trying to argue him into the false belief that he is not being hurt. There are too many minor details, important to the comfort and ease of the patient, which the surgeon often overlooks. He is conscious and very sensitive to the strange environment of the operating room. Loud noises, clanging of the instruments, and sight of bloody sponges tend to upset him and should be avoided. His position on the operating table should be made as comfortable as possible and everything done for him which will provide ease and comfort. After he grows tired and restless; morphia should be given if the operation is to be prolonged. Frequently it is the oversight of the minor details which is responsible for the failure of the operation.

Our technic has consisted entirely of the infiltration method, with the exception of a few cases of spinal and caudal anesthesia.

We employ a 1 per cent solution of procain in salt solution. Formerly we used one-half of 1 per cent solution for herniotomies and similar operations, but we now think the 1 per cent solution has some advantages. The stock solution is made fresh daily by boiling

2.5 gms. of procain in 20 cubic centimeters of salt solution for two minutes. This in turn is emptied into a flask containing 230 cubic centimeters of normal sterile salt solution which is made from distilled water and sterilized in the autoclave. Six drops of adrenalin chloride are added to each 30 cubic centimeters of solution just before use. Usually about 50 cubic centimeters are used for the ordinary operation. The toxicity of procain varies with the concentration and rapidity of injection, and the fact that the drug is toxic should be borne in mind.

About 125 cubic centimeters of a 1 per cent solution can be injected with safety. Morphine and morphine and scopolamine are given as indicated, but not as a routine procedure. For the ordinary case one-sixth grain of morphine is given one-half hour before operation. Morphine is given freely after operation if indicated. Preoperative preparation is made as simple as possible, and cathartics and enemata reduced to a minimum. The advantage of local anesthesia is explained to the patient, but its use is optional with him. Practically all of our patients request local anesthesia.

A good glass syringe and liberal assortment of sharp needles are necessary. Personally I prefer the Record syringe, but unfortunately the genuine Record is difficult to obtain and is not on the supply table. There is, however, a new syringe on the supply table called the "Exacta," which is very satisfactory. The Leur syringe is not well adapted to local anesthesia, and is difficult to handle. We have tried several of the patented self-filling syringes, which were sent us for trial, but found them to have disadvantages.

The technic for spinal anesthesia requires 0.1 to 0.16 gram of procain in 2 cubic centimeters of salt solution, depending upon the size of the patient. After anesthetizing the skin a nonbreakable needle is inserted into the spine between the second and third or fourth and fifth lumbar vertebræ and a few cubic centimeters of spinal fluid allowed to escape. A 10 c. c. syringe, containing the 2 cubic centimeters of procain solution, is then attached to the needle and 6 cubic centimeters of spinal fluid are aspirated into the syringe and thoroughly mixed with the procain solution. By gentle pressure half the contents of the syringe is slowly injected into the spinal canal. This process is repeated several times, assuring a thorough mixture of the procain with the spinal fluid. The bent-over sitting position, with the patient's legs over the side of the table, is the best position. Immediately after the injection the patient is allowed to lie flat on his back.

In caudal anesthesia we use 0.6 gram of procain in 30 cubic centimeters of salt solution. A thin 4-inch nonbreakable needle is inserted well into the caudal canal and the injection made slowly. Frequent aspiration is made to make sure a vein has not been entered. The

injection is made with the patient lying on his stomach. He is allowed to turn over flat on his back immediately afterwards.

On account of the frequent symptoms due to the rapid fall of blood pressure in both spinal and caudal cases, it is important to give stimulation, either before operation or immediately upon the appearance of symptoms. A combination of caffeine and strychnine is the best. It is also best to assume the Trendelenburg position if the symptoms are marked.

We have not used the regional method of anesthesia, but from observation and a review of the literature on the subject, I am convinced that it is not as useful in naval surgery as the infiltration method. The chief advantage is that the procedure can be completed in one stage and can therefore be administered by an expert anesthetist, or a person other than the operator. It is, however, more difficult to administer than the infiltration method and more experience and knowledge of anatomy are required to use it successfully.

DIAGNOSIS AND TREATMENT OF OTITIS MEDIA.

By A. G. Wenzell, Lieutenant, Medical Corps, United States Navy.

Otitis media and its effects are of great importance to the naval medical officer not only in connection with the patient but with the service at large. An order misunderstood as a result of defective hearing may result in untold damage or loss of life. A perforated drum membrane is a bar to enlistment. Still, statistics show that many men with perforations and a quiescent chronic otitis media are enlisted, only to be discharged in a pensionable status when the condition lights up following an acute coryza.

It does not necessarily indicate that a person having 15/15 whispered voice has normal tympanic membranes, and it is often surprising to note the exceptional hearing of a person in whom the membrane of the tested ear has practically been destroyed.

In order to thoroughly examine the ear, a good source of light is necessary, the electric otoscope supplied to the service is by far the best and most convenient, not only by reason of the direct inspection it allows but also the magnification of the parts and the ability to determine the movement of the tympanic membranes by the use of the attached rubber bulb.

In inspecting the canal, its caliber and color should be noted. The caliber of the meatus varies considerably in certain conditions, but an unusual narrowing of the canal should be regarded as pathologic. If the narrowing is present close to the meatus it is indicative of an inflammation of the canal, while if it occurs close to the tympanic membrane it indicates middle ear inflammation.

Four characteristics of the membrane should be observed: First, integrity; second, position; third, color; and fourth, luster.

If the membrane is intact, the observer will be able to follow the membrane from the posterior wall to the anterior without observing any break.

In position the membrane may be either normal, retracted, or bulging.

The color of the membrane under normal conditions is pearl white.

A slight congestion of the membrane may be the result of manipulation of the auricle or the insertion of instruments into the canal. It is characterized by redness along the periphery of the membrane and along the handle of the malleus, the remainder of the membrane retaining its normal color.

The luster is important. Under normal conditions the membrane has a luster not unlike that of a pearl. Total absence of luster—that is, a dead-white membrane—is always indicative of an acute inflammation, and is due to necrosis of the superficial epithelial cells as the result of an inflammatory process.

Otitis media may be classified as acute catarrhal, acute suppurative, chronic catarrhal, and chronic suppurative.

Acute myringitis is a condition that is difficult at times to differentiate from an acute otitis media. It is usually the result of external infection, a continuation of infection from the external canal, the result of the entrance of cold water into the ear, the instillation of caustic or irritant fluids into the canal, and in many cases the direct result of the patient attempting to scratch or remove wax from the external canal with such articles as toothpicks or matches.

The appearances upon otoscopic examination are those that are characteristic of the earlier stages of inflammatory affections of the middle ear. The plexus of vessels along the handle of the malleus is first seen to be injected, and then the redness spreads over a portion or the whole of the membrane. In the severest cases small dark-brown spots are sometimes seen and are caused by minute hemorrhages into the substance of the membrane.

The patient complains of an earache, which may be severe or quite mild, of tinnitus, and a full, stuffy feeling in the affected ear.

Acute catarrhal otitis is an actual inflammation of the mucous lining of the tympanic cavity. The exanthematous diseases, acute coryza, extension of inflammation from the naso-pharynx, getting water into the mouth while bathing and violently expelling it, and the improper blowing of the nose, are some of the predisposing and exciting factors in this condition.

Deep-seated pain in the ear is one of the earliest symptoms; when the inflammation has reached its height, the pain is of a lancinating and tearing nature. There are intervals in which the pain is less severe, but upon swallowing or coughing a sharp pain shoots to the ear, and the paroxysm of intense suffering is renewed.

The appearance of the membrane varies with the stage of the disease at which the examination is made. During the first few hours after the onset a redness will be visible along the handle of the malleus, which, if observed later, will be found to have spread over the greater portion of the membrane, and later the entire membrane has a uniform cherry-red color. In a large majority of cases exudate takes place into the tympanic cavity, and this is demonstrated by the bulging of some portion of the membrane.

Blebs may be differentiated from bulging by noting the outline of the border of the bleb and the sagging due to the retained fluid.

With the formation of pus in the tympanic cavity, or its formation after rupture or incision, the condition becomes that of an acute suppurative otitis media.

Spontaneous rupture of the membrane is due to the intratympanic pressure of the fluid, which weakens or impairs the circulation over some area, and as a result the membrane is ulcerated and finally gives way.

The treatment of the various forms of acute otitis media naturally depends upon the condition found at the time of examination. In a case of myringitis the pain is often the predominating symptom and is best combated by the use of the opiates, hot saline irrigations of the external canal every hour or so, a hot-water bottle to the ear, and as a routine measure urotropine. I am convinced that in a great many cases, especially in children, an incision has been averted by the use of this drug, naturally the dose being in accordance with the child's age.

The same treatment is indicated in a case of acute otitis media in which there is no indication of intratympanic fluid. It must be remembered, however, that an apparently subsiding acute otitis media may suddenly flare up and become the suppurating type, necessitating an incision; this is usually preceded by an increase of pain and a sudden rise of temperature.

In the acute suppurating type in which there is more or less bulging or bleb formation an early and effective incision is indicated. Many methods and types of incision have been advocated, but the most logical and most efficacious is the long posterior incision, extending from the upper portion of the posterior inferior quadrant, to the anterior inferior junction or slightly beyond. The incision

following the posterior wall of the canal and forming a quarter circle.

Many types of exudate will be met with in the incision of membranes. In one a drop of thick glassy mucus resembling grape pulp is expelled with evident force. In some a slight amount of blood or serum is discharged, changing to pus in a short time; frequently an incision will be made and gas or air under pressure will escape with a hissing sound that may be heard several feet away, a slight serous discharge following.

Whatever the type of discharge, the treatment is the same—saline irrigations every four hours, for the first few days, the amount of purulent discharge determining the interval of irrigation after that. As the excessive discharge subsides a solution of 5 per cent mercurochrome may be instilled into the external canal; this tends to hasten the healing of the membrane by inhibiting the bacterial growth both in the external canal and intratympanic space.

The question of an anesthetic is constantly arising in connection with the incision of the membrane. In children gas or ether is advisable. A local anesthetic in adults, in the great majority of cases, causes more apprehension and pain than the actual incision, which requires but a fraction of a second, and further manipulation of the ear is unnecessary.

Any fluid introduced into the external canal as a local anesthetic obscures the vision, and the resulting manipulation, either removing the substance with a cotton-tipped applicator or syringing, causes the patient intense pain and tends to increase nervousness. This also applies in the treatment of undetermined cases. The common use of phenol and glycerin in the external canal prior to a positive diagnosis tends to make the examination more difficult, and when in doubt as to whether the condition is one of an external otitis or otitis media, the use of the hot saline irrigation and a sedative is advisable.

It might be well to add that saline is preferable to boric-acid solution in ear irrigations in that in time the boric acid tends to accumulate in the external canal.

When after incision or rupture of a tympanic membrane the discharge continues over a period of four to six weeks, the condition merges into a chronic suppurative otitis media.

The amount of discharge varies in different cases from that so profuse as to fill the auditory meatus several times a day to a quantity so small that it seldom wets the whole canal. When produced in such minute quantity the pus dries about the edges of the perforation or upon the canal walls in hard masses, and may easily be mistaken for inspissated wax. This is the class that so often escape detection upon enlistment.

In the mildest cases and those that have received proper care in the way of cleansing the pus may have little or no odor. In many cases, however, even after the most thorough cleansing possible, the penetrating odor of the purulent discharge persists, and is often characteristic of chronic aural suppuration.

Upon examination the membrane may show any type of perforation or degree of destruction from a small punched-out glistening-edged perforation to entire destruction of the tympanic membrane.

The voice, whisper, and watch tests indicate a loss of hearing power which varies greatly in different individuals, the hearing in many cases being in no way proportionate to the destruction of tissue.

In chronic purulent otitis media treatment must be based upon the diagnosis; therefore, before curative measures are attempted a definite conclusion as to the extent of the disease should be determined. An aural discharge may result from necrosis, or new growths in the middle ear, or the pus may have its origin in the spaces that communicate with the tympanic cavity, namely, the mastoid antrum and cells.

Constitutional treatment is indicated in anemic, syphilitic, and tuberculous patients. Impaired nutrition due to any cause will in many cases neutralize the beneficial results of local treatment.

Cleanliness of the aural cavity is the first consideration in the local treatment of any case. This, combined with the use of mercurochrome 5 per cent instilled into the cavity after syringing will cure many of the milder cases.

Removal of polypi, granulations, or any obstructing material is absolutely essential to treatment.

Pain in a case that has been draining freely, localized swelling over the post auricular region, or within the auditory canal, dizziness and sudden, marked, or total deafness, nystagmus or strabismus of sudden onset, and the cessation of the discharge from an ear that has been suppurating profusely are symptoms that indicate a serious and further advance of the condition, necessitating in most cases a radical operation.

Probably the most frequent cause of chronic catarrhal otitis media is previous, and frequently repeated, attacks of acute catarrhal otitis media, due to a diseased state of the upper air tract, with resulting exudates in the middle ear and the ultimate formation of connective tissue in the tympanic membrane.

The chief complaints of these patients are impairment of hearing and head noises. The character of the sounds heard by the patients varies greatly and may range in description from the singing of a steam kettle to escaping steam from a locomotive.

The appearance of the membrane varies; it may be thickened or atrophic, translucent or opaque, retracted or normally situated, and chalky deposits are often observed.

The treatment consists in efforts to arrest the progress of the disease and to restore as far as possible the affected parts to normal. This consists mainly in inflation of the Eustachian canal, either with the Politzer bag or catheter. By the use of the pneumatic otoscope, increasing and decreasing the air pressure in the external ear, with the consequent movement of the tympanic membrane, small adhesions may be broken up and further formation prevented.

Any predisposing factor in the upper air passages should be corrected and the general health of the patient brought to par.

It might be well to mention in closing the treatment of ruptured membranes incident to gunfire. In the great majority of cases the rupture consists of a splitting of the membrane to a greater or less degree, with a slight bloody or serous discharge, the essential point in these cases is the prevention of infection, and this may be accomplished many times by allowing nature to take care of the injury for the first 24 to 48 hours, aiding to some extent by the use of urotropine, and sterile cotton pledgets in the external canal. If after 24 or 48 hours the membrane has not closed and infection has taken place, the treatment should be the same as in a rupture or incision in acute suppurating otitis media.

EDITORIAL.

SYPHILIS OF THE LUNG.

Acquired syphilis of the lung has always been looked upon as a rare condition, and the diagnosis is not often made, either during life or at autopsy.

In Osler one finds the statement that in 2,800 post-mortems at the Johns Hopkins Hospital there were 12 cases with syphilitic disease of the lungs; in 8 of these the lesions were in cases of congenitally acquired syphilis, and in only 3 of the cases was the disease suspected before death. Some years ago Sir J. K. Fowler visited the museums of the London hospitals and the Royal College of Surgeons and could find only 12 specimens illustrating syphilitic lesions of the lungs.

Downing (*Arch. Dermat. and Syph.*, July, 1921) found no cases among 3,000 necropsies at the Massachusetts General Hospital, while among 6,000 post-mortems at Copenhagen Massia describes only two cases. While acquired pulmonary syphilis is considered rare and not a well-recognized post-mortem condition, in congenital syphilis it is not an infrequent pathological finding, occurring as the well-known white pneumonia of which Virchow wrote a classical description. As Sir Clifford Allbutt has recently pointed out (*Brit. Med. Jour.*, 1921, p. 177), it is well to remember that acquired syphilis is a possible cause of many cases of chronic indurative affections of the lungs. The physical signs of these fibroses are equivocal, but if the modern serological tests be applied to every case of fibrosis of the lungs and if all positive findings could be checked up at autopsy many more cases of lung syphilis might be recognized.

"While the final proof of pulmonary syphilis must be sought for at the post-mortem table, there is, nevertheless, a small group of cases where more than presumptive evidence points to pulmonary syphilis. Sir Clifford Allbutt puts it that the spirochete is not above keeping company with the tubercle bacillus, and syphilis and tuberculosis may occur together, and the end result of both diseases may, either acting independently or together, be the same—fibrosis and cavitation giving rise to a parallel set of symptoms and indistinguishable not only in local signs but in general reaction. Still, there are cases admitted to a sanatorium in which the morbid process is atypical

of tuberculosis. Fishberg points out that syphilis of the lung manifests itself by cough, expectoration, slight fever, loss of weight, and even by haemoptysis, but he observes that the course of all the cases is slow and that the patient is not perceptibly disabled. Ficacci says that syphilis of the lung is *probbaly* more common than is generally believed, and he briefly records six cases. Clinically, he says, one may suspect syphilis if the symptoms are of long duration, if there is a positive Wassermann reaction, frequent haemoptysis, and, if the disease affects the middle and lower lobe of the right side, with marked evidence of fibrosis of that lung, bronchiectasis, a slow course, no fever, and no tubercle bacilli, i. e., a good state of general health, other syphilitic lesions present, and no history of any other illness likely to cause bronchiectasis. Fishberg also points out that the disease is to be found in the middle and lower lobes, and if the apex is free from disease this alone should excite suspicion."

Dr. W. T. Munro, who presents a paper on this subject in the *Lancet* of December 30, 1922, from which the preceding paragraph is taken, found that of 100 admissions to a sanatorium for the treatment of tuberculosis at Glenlomond, Scotland, 6 per cent proved to be cases of syphilis of the lungs *per se*, and 11 per cent gave a positive Wassermann reaction and had tubercle bacilli in the sputum.

Clinical pulmonary syphilis may occur in three types: (1) As isolated gummata, (2) as a diffuse fibrosis, and (3) possibly as a diffuse broncho-pneumonia.

According to Wile and Marshall (*Arch. Dermat. and Syph.*, July, 1921), recognizable gummata of the lungs are exceedingly rare. These observers, however, believe that gummata will not be infrequent in the initial stages of a fibrosis, and if large may result in a later cavitation.

These assertions, as Munro points out, agree with Norris and Landis (*Textbook on Diseases of the Chest*), who state that when gummata occur in the lung they are apt to be numerous, vary in size, become walled off by thick fibrous tissue and are generally recognized as a fibrosis. It is possible for a large gumma to caseate, break down and empty into a bronchus producing a pulmonary cavity from which a hemorrhage may occur. The larger gummata usually form in the hilus and in the lower lobes.

In Munro's cases fibroid changes were the most common. These cases were characterized by cough of long duration, sputum negative for tubercle bacilli, and sometimes blood stained but never a hemoptysis. The patients had no fever, no distress, and the general health seemed but little impaired. The clinical course of syphilitic fibroid induration is slow. The condition occurs in middle age, as does aneurism, and the length of time between the initial sore and

the appearance of symptoms referable to the chest is a matter of years. The pathological process as a rule does not affect the apices of the lungs; the Wassermann reaction, of course, is positive, and the condition tends to clear up under antisyphilitic treatment.

Munro quotes Lewis and Landis (Amer. Jour. Med. Sciences, 1915), who state very plainly that the diagnosis of acquired pulmonary syphilis is usually made by exclusion. "Thus if the symptoms and physical signs are those characteristic of tuberculosis, and the sputum does not contain tubercle bacilli, or the progress of the disease differs from that usually encountered in tuberculosis, the possibility of some other exciting cause should be thought of." Cadis and Phipps (Boston Med. and Surg. Jour., March, 1917) point out that the symptoms of pulmonary syphilis are essentially those of pulmonary tuberculosis, except that they are less pronounced. A Wassermann reaction should always be obtained, but must not be too readily considered diagnostic. It is a link, as Munro reminds us, in the chain of evidence, and should not replace a carefully taken history. It is to be used as confirmatory if the history and physical examination suggest a syphilitic origin.

Speaking of the broncho-pneumonic type or those cases presenting areas of consolidation and catarrh, Munro says: "Syphilis is so diverse in its manifestations that, although a fibrosis is the most common manifestation of the syphilitic disease of the lungs, focal lesions are to be expected." Although Lewis and Landis state that the general opinion has been that the apices are but rarely affected, they describe six cases in which the physical signs pointed to a focal lesion in the apex and in which the evidence seemed conclusive that a latent syphilitic process was at work. Munro describes two such cases among his patients at Glenlomond, in which cough had persisted for years; the lungs showed patchy dullness, the apices being involved in each case, sputum negative for tubercle bacilli, and the Wassermann reaction strongly positive. Both cases cleared up rapidly under antisyphilitic treatment.

In acquired pulmonary syphilis the prognosis seems to depend upon early recognition and prompt treatment of the condition, and for this reason Sir Clifford Allbutt lays emphasis on the close observation of a bronchitis appearing after a luetic infection lest during a curable stage irreparable mischief be done.

According to Munro, in cases of early consolidation, there seems to be no reason why the condition should not clear up completely. In fibroid cases early treatment means a speedy relief and the disappearance of the symptoms, but a complete return to the normal condition can not be expected if the fibrosis has been permitted to become extensive.

ON SAFETY IN AVIATION.

After many years of attempted flight in which many lives have been lost, aviation is an accomplished fact and its future depends upon such scientific solving of the problems of pilot and plane that safety in the air will be assured. The problems of the plane are being rapidly solved, and with an understanding of the laws of aerodynamics the modern aviator has outdone the birds in their own element in every point except in the matter of safety. The builders of the planes have practically eliminated structural defects and have added many improvements which tend directly to increase the safety of the plane. Among these improvements, according to Gen. W. H. Wilmer, who writes on this subject in the *Military Surgeon* for January, 1923, are greater strength and higher lifting qualities in the wing sections; greater and easier control; greater stability; propeller designs that will take advantage of every condition of flight; improvements in wheels, tires, landing skids, etc., which assist the operator in alighting and taking off safely; and the greater use of metal in the structural parts of the machine. The new oil and fuel supply system is efficient and reliable, yet not dangerous in case of accident. The improved carbureter is practically "foolproof," and the magneto is one that insures the proper ignition under all conditions. The new propellers are made of "Bakerite," a great advance over the old ones of wood. An important recent improvement is a new electric starting device which has eliminated the dangerous method of starting the engine by spinning the propellers by hand.

Probably more than half of the instruments used on an airplane are placed there to increase the safety of the operator. Among these may be mentioned the aerial compass, drift indicator, inclinometer, altimeter, and the air-speed indicator, the oxygen supply system, and parachutes.

One of the most far-reaching inventions for safety, as General Wilmer points out, is radio communication. By means of the radio direction finder in fog, mist, or at night the aviator may be guided on his course or directed to a suitable landing place. The radio telephone also permits easy communication with other flyers on the ground. Even the Weather Bureau has entered the flying game, and we now have an official "flying weather forecast" in the daily papers, and it is not at all unlikely that before long air traffic regulations will be enforced.

It is practically certain that in the future the aviation fatalities due to the machine will be less in number than to-day, and it is believed that the flight surgeon will be able to lessen materially the number of accidents due to causes inherent in the aviator. Army experience in aviation has shown that about 96 per cent of the fatali-

ties which have occurred since January, 1919, were due to faults or circumstances directly connected with the pilot himself and that only 4 per cent of flying fatalities are due to failure of the machine.

Attempts to diminish the fatalities of aviation must be preventive in character. High standards—mental, nervous, and physical—should be maintained in selecting men for aviation; and the pilots thus chosen should be kept fit to stand the physical and mental strain of flying. The selection and care of aviators offers a splendid field of service for the naval medical officer. The problems that concern the flier himself—his training, his physical fitness, his psychology—lie very naturally within the special sphere of the student of aviation medicine, but one entering this special field of medical practice must supplement his study of the human machine as applied to aviation by a practical knowledge of the laws of aerodynamics and the construction and operation of the various types of airplanes and their motors. Such a knowledge can be obtained only at active air stations.

A practical course of aviation medicine consists of from three to four months' training in psychiatry, physiology, cardio-vascular conditions, ophthalmology, otology, psychology, and in the application of this knowledge to the examination of aviation personnel and candidates for aviation training. Only two schools of aviation medicine have been established in this country—one an Army institution at Mitchel Field, Long Island, and one in connection with the Naval Medical School, Washington, D. C. Due to the existing shortage of medical personnel in the Navy, capable of acting as instructors in this specialty, the aviation section of the Naval Medical School is not functioning at present, and naval medical officers accepted for training in aviation medicine are being trained in the Army school. It is expected that instructors will be available and that in the near future we may train our own flight surgeons and work out those medical problems peculiar to naval aviation at the Naval Medical School.

DIAGNOSIS OF EARLY PULMONARY TUBERCULOSIS.

Failure to diagnose tuberculosis in its early stages is the factor which tends more than any other one to defeat the ultimate cure of the disease, and this same factor, by permitting the disease to progress and reach the stage of open lesions before it is recognized, tends to spread the infection.

By early pulmonary tuberculosis is meant a circumscribed lesion in the form of infiltration limited to the apex or a small part of one lung. In this stage of the disease there are no tuberculous complications, slight or no constitutional symptoms, slight or no elevation of

temperature nor acceleration of pulse. Expectoration may be small in amount or absent, there may be no cough and tubercle bacilli are generally absent.

Errors in diagnosis are generally due to lack of care and thoroughness in the examination, inclination to wait for a positive sputum, failure to utilize the X ray, and lack of an accurate conception of existing pathology and failure to correlate the history and clinical findings.

When confronted with a suspicious case the following factors are to be considered:

1. Family history.

Intimate exposure to infection, especially if prolonged.

2. (a) Losses in weight.

(b) Winter colds.

(c) Ease of fatigue.

(d) Hemorrhage from lungs.

(e) Pleurisy with effusion.

(f) Unexplained fever.

(g) Cough, especially in the early morning.

(h) Expectoration.

3. Examination including—

(a) Physical.

(b) X ray.

(c) Tuberculin test.

(d) Daily temperature record.

(e) Sputum examination.

A complete history is essential in every case and is just as important as the physical examination. Much skill and judgment are required to select the essentials and to discard valueless data that may be obtained in the process of history taking. There is evidence to show that practically all tuberculous infections occur during childhood; therefore, the history of active tuberculosis in the family, especially if the patient under examination had the opportunity for intimate and prolonged contact during childhood, is very important.

A careful inquiry into the personal history will usually result in eliciting sufficient symptoms to point definitely to pulmonary tuberculosis and make such a diagnosis a probability.

The symptoms which should be disclosed by the history fall into three groups, the first being toxic, on which the activity of the disease is based; the second, reflex, which points to a pathological condition in the lungs; the third, due to the process in the lungs *per se*, is almost pathognomonic of the disease.

The question of toxemia is considered because, depending on whether or not the patient shows evidences of toxemia, is the condition made a clinical one. The important toxic symptoms in the early

stage of the disease are increase in the pulse rate and temperature for long periods of time and fatigue.

Pathologic lesions in the lungs produce a group of reflex symptoms which Pottenger groups as follows:

Hoarseness.

Tickling in the larynx.

Cough.

Circulatory disturbances.

Chest and shoulder pains.

Spasm of muscles of shoulder girdle.

Digestive disturbances.

Flushing of the face.

The above may occur with any pathological condition in the lungs; but as pulmonary tuberculosis is the most frequent infection involving the lungs, it is the one most often responsible for reflex symptoms.

The symptoms due to the lesion of the lung *per se* include expectoration, hemoptysis, and pleurisy with effusion. The expectoration is always associated with the reflex symptom—cough, and its existence over a long period of time must make one suspicious of tuberculous involvement of the lungs. A sputum which does not contain tubercle bacilli means nothing in the diagnosis.

Hemoptysis is almost pathognomonic of the disease, but it may occur in other conditions, such as mitral stenosis and so forth. These conditions, however, are not as frequently seen as tuberculosis. The same is true for pleurisy with effusion, which from experience we know to be almost always associated with a tuberculous process, although it may occur with other conditions. A history of this condition should be considered as pointing to tuberculous infection until proved otherwise.

Of the time-honored methods of inspection, palpation, percussion, and auscultation, the two latter are the ones upon which we depend most in the examination of the early stage of the disease, although the low grade of inflammation that results from infection may produce slight lagging in the action of the muscles over the involved area which may be noted on inspection by an expert.

Percussion may or may not give evidence of value, because there is rarely any real dullness in any early process but only a slightly diminished resonance, a shortening of the note, a higher pitch, and a slight feeling of resistance under the finger. It is important to bear in mind that normally percussion elicits a dull note over the right apex, the second intercostal space on the right side, and the interscapular spaces between the seventh cervical and fourth dorsal vertebræ.

Many workers agree that auscultation is by far the most important method in the physical diagnosis of early pulmonary tubercu-

losis and that the character of the physical findings is not as important as the situation of these physical findings. Physical findings indicating infiltration in the upper lobes must be considered tuberculous until accounted for by other pathological conditions. In this method of examination it is well to remember that normally bronchovesicular breathing is heard over the right apex, over the second intercostal spaces close to the sternum, and over the interscapular spaces. Bronchial breathing is normal over the trachea and larynx and vesicular breathing is normal over all other portions of the lungs. When infiltration occurs in the pulmonary areas over which vesicular breathing is normal, the normal vesicular murmur changes and tends to approach the bronchovesicular type. When the infiltration is present in those parts of the lungs in which bronchovesicular breathing is normal, the murmur changes to the bronchial type and the expiratory sound is prolonged. Bronchovesicular breathing over the right apex is normal, and the same breathing over the left apex denotes infiltration.

In auscultation the patient should be instructed to breathe normally through the mouth. Forced breathing will exaggerate breath sounds. Any modifications in the normal breath sounds or any adventitious sounds are to be noted. If no râles are heard, they may be brought out, if present, by having the patient exhale, cough gently, and then breathe deeply. This procedure will not only bring out râles if they are present but will accentuate râles heard during normal breathing.

Tuberculosis has a predilection for the upper lobes, and it may be stated that modifications of the normal breath sounds and persistent adventitious sounds heard above the third rib anteriorly and the fourth vertebral spine posteriorly should be considered as indicating a tuberculous process until they can be accounted for by another condition.

Persistent râles when present in this locality are pathognomonic of the disease. Unfortunately, râles are not always present, whereas, due to the infiltrative process of the infection, bronchovesicular breathing is almost always present, and the amount of bronchial element in the bronchovesicular breathing is almost proportionate to the amount of infiltration.

In any case with a suspicious history pulmonary tuberculosis should never be excluded until the patient is given the advantage of an X-ray examination conducted by one who has had considerable experience in such work. In many cases the X ray is capable of revealing structural changes before the appearance of any physical signs, and in practically all cases this examination shows changes much greater in extent than the physical signs indicate.

At the present time the tuberculin test is not considered very valuable, except in the diagnosis of tuberculosis in children. A

negative result, instead of proving that there is no tuberculosis, is more likely to mean that the patient has established some degree of immunity and no longer reacts to that particular dose of tuberculin. A positive reaction usually means that tuberculosis is present somewhere in the body, but it does not indicate that the process is active.

The finding of tubercle bacilli in the sputum is considered absolute proof of an active tuberculous process and always indicates destructive changes in the pulmonary tissue. Tubercle bacilli are significant of an advanced or moderately advanced stage of the disease, and one should never wait for their appearance in order to make a diagnosis.

ON THE SYMPTOMS OF RENAL CALCULI.

With our modern diagnostic resources we find that there are many conditions which can give rise to a syndrome resembling in every detail the group of symptoms formerly supposed to be pathognomonic of renal or ureteral calculi.

Colicky pain radiating downward from the kidney toward the genitalia and bladder can be caused not only by calculi but by a number of other renal and ureteral conditions such as the passage of clots in cases of pyelitis, neoplasm, or in essential hematuria; in certain forms of nephritis; in kinking of the ureter due to a movable kidney; the passage of pus or débris in infections; in ureteritis or in strictures of the ureter; the passage of crystalloids precipitated from the urine. In addition to these causes of colic there are a number of conditions outside the urinary tract in which colic is the most prominent symptom. Among these may be mentioned gall stones, pancreatic calculi, appendiceal colic.

A frequent mistake in diagnosis is the failure to consider the possibility of a tabetic crisis when confronted by an acute abdominal condition accompanied by colic. One should test the patellar and pupil reflexes in every case presenting the syndrome of ureteral colic in order to avoid embarrassing mistakes.

What has been said of ureteral colic may likewise be applied to other kidney symptoms, such as hematuria, pyuria, enlargement of the kidney. There are a number of other kidney conditions which can give rise to the same symptoms. It follows that only after a close study of the clinical history and a physical examination in which are used the special methods of diagnosis now employed for the urinary tract, will one be able to state with certainty that the clinical picture is due to a calculus and not to some other lesion causing similar symptoms.

Clinically the presence of a calculus in the kidney is revealed by one of the following conditions: The presence of dull pain over one

or both kidneys increased upon exertion and often but not necessarily accompanied by blood or pus in the urine; typical colicky pain radiating down the ureter, which must be differentiated from the colic due to other conditions; the presence of blood or pus in the urine without pain—the so-called silent cases, which include those in which the calculus causes no symptoms and is found during the course of a routine X-ray examination. At times the calculus causes obstruction at the outlet of the renal pelvis resulting in enlargement of the kidney and cases of calculous anuria occur due to obstruction of one ureter by a calculus with reflex anuria of the opposite kidney.

One should never make a hurried diagnosis of renal calculi from symptoms alone, but should employ a carefully taken history and a thorough physical examination as a foundation for further urological study of the case.

ON THE ETIOLOGY OF GALL-BLADDER DISEASE.

The liver, like the kidneys, is to a large degree an excretory organ. The biliary tract is the transit system for bile, and the gall bladder is a sidetrack in the course of this transit system. It plays no very active part in upper abdominal digestion. The lack of the organ in many animals and the comparatively unimpaired digestion which occurs after cholecystectomy justify this conclusion. The modern viewpoint seems to be that the gall bladder is in a way a safety valve for pressure in the common duct (Oddi) and that it plays a part in the concentration of the bile by absorption of water. Rous and McMaster (Proc. Soc. Exper. Biol. and Med. No. 17, 215, 1920) have shown distinct differences in the quality of the bile from the gall bladder and that from the ducts, and that the inspissation of the bile in the gall bladder can proceed with great rapidity.

As one studies the anatomy and physiology of the gall bladder three facts become apparent. The first is that the gall bladder serves in some way as a storage place for a moderate amount of bile, and the nature of this bile will in a sense determine certain conditions affecting the organ. Next, the nature of the bile is dependent upon the integrity of the liver cells. Lastly, the liver cell is dependent upon the character of the portal blood, which in turn is dependent upon the nature of the intestinal contents. Aside from the question of malignant disease, the two great problems relating to gall-bladder disease are the question of infection of the organ and the formation of calculi.

In connection with the first question it may be said that two of the great advances in modern medicine are the discovery of the selective localization of bacteria of a given virulence in certain

parts of the body and the selective elimination of bacteria. Rosenow has shown that in a series of experiments with streptococci from gall-bladder lesions there was localization in the gall bladder of experimental animals in 80 per cent of cases. Equally significant, according to Rehfuss (South. Med. Jour., February, 1923), is the fact that 21 per cent of Rosenow's animals receiving ulcer strains showed a localization in the gall bladder, while 29 per cent of the animals receiving gall-bladder strains showed a localization in the stomach and duodenum or stomach; hence the frequent association of these lesions.

Regarding the selective elimination of organisms, the specific elimination of the typhoid group through the liver and biliary passages has long been known. Students of this question are beginning to look upon a gall-bladder infection as a sequel rather than a cause of repeatedly infected bile. Gall-bladder bile is rarely bacteriocidal, and once bacteria gain the wall of the gall bladder they multiply, invade the mucosa, and spread by the lymphatics. Richet (Penna. State Med. Jour., October, 1922) found that 51 per cent of 408 gall bladders removed at operation showed a positive culture. These findings have been corroborated by many other observers, and it is now generally acknowledged that infection of the gall bladder takes place either through hematogenous or through hepatogenous sources.

Damage to the hepatic cell appears to be a precursor to the appearance of bacteria in the intrahepatic bile current. According to Rehfuss, an intact liver cell is not likely to produce an infected type of bile. Hartman, of the Mayo Clinic, has called attention to the fact that in chronic inflammations of the gall bladder there is an infiltration of bacteria which cannot be reached by any known method of local treatment, and, as Rehfuss points out, focal infections, the condition of the blood stream, and the integrity of the hepatic cells are the determining factors in gall-bladder pathology.

Regarding the question of the formation of renal calculi, there appears to be a type of individual who is clearly predisposed to biliary lithiasis. Chauffard, in his book on biliary calculi, calls attention to the fact that there is a group of persons who are hypercholesterolemic and in whom the biliary mechanism is deficient. Chauffard assumes that there is an increase in the circulating cholesterol, with resulting increase in the cholesterol of the bile. Ordinarily this cholesterol is held in solution by the bile salts, but under certain conditions there is hepatic insufficiency, with an insufficient formation of bile salts, and consequent precipitation of cholesterol. Chauffard believes the liver cell is at fault, and that the determining factor affecting the liver cell is to be found in the chemistry of the

intestinal tract. Recently investigators in the laboratories of the University of Pennsylvania have not been able to confirm Chauffard's theory. According to Rehfuss, the only explanation of this phenomenon is the probability that at certain periods there is a marked increase in cholesterol, with the formation of stones, followed by periods in which the cholesterol is either normal or sub-normal. The question requires further study, as there are many other conditions, outside of the mechanism suggested by Chauffard, which apparently are associated with a high blood cholesterol. Syphilis, diabetes, and arterial sclerosis are found associated with it, and defective metabolism may play a part.

ON THE FORMATION AND RE-FORMATION OF RENAL CALCULI.

Every crystal, so the physicists say, is formed around a nucleus of colloid material. Normal urine contains the necessary albuminous or colloid material for the formation of such a nucleus, and as the urine is to a certain extent a solution of crystalline substances, if these are present in excess they are precipitated. Hence, the material for the nucleus already being present in the normal urine, it is not difficult to conclude that under favorable conditions the colloids and crystals combine to form calculi. Calculi are found in aseptic kidneys, and, on the other hand, the presence of infection in a kidney is very frequently followed by the formation of calculi. Two other factors which favor the formation of calculi have been observed, namely: (1) That stagnation of or obstruction to the escape of urine from the kidney is an important element, and (2) that the formation of calculi is especially apt to take place when there is a disturbance in the innervation of the kidney, as occurs not infrequently after a spinal-cord injury or disease. The stagnation of the urine appears to result in a precipitation of colloids and crystal formation, and it has been observed that bacteriuria may be present for years without the formation of calculi if there is no stagnation.

Uric acid and oxalate calculi are the varieties usually found when infection is absent, but as soon as the latter supervenes the composition of the calculi changes and calcium phosphate and carbonate calculi occur either primarily or around the uric acid and oxalate calculi as a nucleus.

These observations clear up many of our hazy views in regard to calculi and are of especial importance in relation to the formation or recurrence of calculi after operation.

Often in a given case weeks or months after operation calculi are found and the question is asked: Were they overlooked at the time of the operation, or have they re-formed? The frequent recurrence

of calculi after operation is a very serious question and, according to Eisendrath, who writes upon this subject in the *Wisconsin Medical Journal* of January, 1923, it has influenced the indications for operative interference to such an extent that many surgeons are advising against operation for multiple or large branching calculi if infection is present, because true recurrence is only a question of time. Unfortunately, we do not know yet why certain individuals have an excess of uric acid or oxalates in the blood and are prone to have recurrences of calculi even though infection is absent.

It is quite probable, however, that many of the so-called recurrences of calculi after operation are not instances of true re-formation but are the result of small calculi being overlooked at the time of operation. Cabot and Crabtree (*Surgery, Gynecology, and Obstetrics*, August, 1915) have shown that in 51 per cent of cases undergoing pyelotomy at the Massachusetts General Hospital stones were found to be present in the kidney at a subsequent time.

J. D. Barney (*Surgical Clinics of North America*, June, 1921), in commenting on this fact, remarked that while there is no question that some of these stones were actual recurrences, he believed that it is equally certain that many were stones which had been overlooked at the time of operation.

With the improvements in X-ray technic, the use of fluoroscopy at the operating table, as described by Braasch and Carman (*Mayo Clinics*, November, 1919), and the modern bloodless method of operating it is probable that there will be less so-called recurrences. However, the study of the recurrence of renal calculi has taught surgeons to eliminate all causes of obstruction which favor stagnation of urine and to give a guarded prognosis as to the recurrence in the presence of infection.

ON THE ORIGIN OF GALLSTONES.

Numerous circumstances and influences favor the development of gallstones, but uncertainty exists as to which of them are contributory and which definitive.

It is commonly believed that infection of the biliary tracts usually plays a significant part in cholelithiasis, but there is evidence that infection is not the only factor that may lead to the precipitation of bile constituents. Rous, McMaster, and Broun, of the Rockefeller Institute, writing in a recent number of the *Proceedings of the Society for Experimental Biology and Medicine*, describe their experimental production of gallstones in dogs in the absence of infection, which throws some light on this subject. These observers have found it possible to connect a rubber or glass tube to the common bile duct of a dog, after the removal of the gall bladder, and collect

the bile under sterile conditions for months. Out of 12 dogs thus treated, calculi were found in 6, and in 3 of these the bile had been sterile. The calculus formation never occurred in the bile ducts. It was found only on the walls of the tubes, and then only in the presence of organic *débris*, such as dead cells and mucus. Microscopic examination of the calculi showed them to consist of calcium bilirubinate and calcium carbonate, with a scaffolding of organic matter. Cholesterol was not found in them. The majority had a center of calcium bilirubinate, surrounded by an envelope of crystalline slightly pigmented carbonate; but stone consisting almost wholly of one or other substance was found. The relation of the calculi to the organic *débris* associated with them differed significantly. Those formed primarily out of calcium carbonate originated in the midst of lumps of *débris*, whereas the bilirubinate stones were so situated as to suggest that they had once been free in the bile, but had been caught and retained in the *débris*. These observations seem to show that infection is not the essential factor of cholelithiasis. In those cases in which infection does play a determining part in gallstone formation it seems to act by damaging the duct walls, with resulting desquamation—which the sterile tubes did in these experiments—and by lessening the ability of the bile channels to rid themselves of cell *débris*. This *débris* induces the direct deposition of solids and may catch and retain potential nuclei for stone formation in the shape of pigment particles from higher up in the biliary system, which would under ordinary circumstances be voided with the bile.

NOTES AND COMMENTS.

It was reported in 1921 that bilharziasis was endemic in Portugal, and the matter was considered of sufficient importance to warrant a special inquiry. The results of this investigation, conducted by Bettencourt and Borges, of the Instituto Camera Pestana, Lisbon, have recently been published. In commenting on the report the *Lancet* says:

"The first case reported on by Borges was a woman of Tavira (Algarve), who had never been out of the locality. The source of infection was found to be the public washing pool, supplied by water from a spring which, while not exactly hot, was found to have a temperature of about 80° F. Moreover, the pool proved to be a habitat of a species of mollusca, *Planorbis corneus metidjensis*, constituting a suitable intermediate host for the larval bilharzias. Conditions being thus suitable, it is not surprising that several cases of infection were discovered. With few exceptions these were women who were in the habit, barefooted, of washing clothes in the pool. About 70 per cent of such women were discovered to be infected with bilharzia. Only one male case was recorded, a boy of 13 who was in the habit of bathing in the pool. According to Bettencourt and Borges, the infection was probably introduced from Morocco, and while it seems fairly certain that this endemic focus has been in existence for some time the infection does not appear to have spread to any extent, probably because suitable local conditions are not common. It has on occasion been asserted that bilharziasis is endemic in Greece, but according to Professor Savas, of Athens, such cases as have been discovered have contracted the disease in Egypt. Since the late war sporadic cases of bilharziasis have become known by personal experience to a certain number of medical men in England, but such cases have in every instance, we believe, been contracted abroad. On general grounds it might be asserted that the disease is quite unlikely to become endemic in any part of that country. One must not forget, however, that 30 years or so ago a similar assertion might have been made, with a certain show of reason, in the case of ankylostomia, which, however, invaded the Cornish tin mines and created quite a considerable amount of trouble. On that account sanitarians in England can not afford to ignore the possibility, remote, though it be, of the occurrence of indigenous bilharziasis."

Since tonsillectomy has become an operation easily performed under local anesthesia it has become quite popular, and one some-

times wonders if its present popularity is justified. We are informed in a recent number of the *Lancet* that so little has hitherto been published with regard to the permanent effects of tonsillectomy on adults that it is well to give publicity to data on which the practitioner can form a comparatively independent opinion. The material must be large, the procedure uniform, and the interval between the operation and the date of reexamination must be considerable if these data are to be instructive. It is also necessary that adults and children should be classified separately, as they differ materially in this respect. These conditions have been fulfilled in a paper recently published by Dr. F. Norsk in *Ugeskrift for Læger* for December 7, 1922. He addressed an elaborate questionnaire to 229 adults (70 men and 159 women) who had undergone tonsillectomy in the 10-year period 1910-1919 in a hospital in Copenhagen. The technique of the operation was uniform, and the surgeon who performed the operations also checked the late effects. Of the 130 patients who answered the questionnaire, 72 also presented themselves for reexamination. Of the 102 operated on for recurrent attacks of acute tonsillitis, 85 had lost their symptoms and 9 had obtained some relief. Of the 33 operated on for peritonsillar abscess, 30 had lost their symptoms and 2 were better. All the 14 patients who had suffered from acute tonsillitis with rheumatic fever were symptom-free, and so were all the 4 whose chronic rheumatism had been an indication for tonsillectomy. There were also 5 cases in which the operation had been performed for tonsillitis with fetor oris, and only in 1 case did this symptom persist. An instructive discovery made on reexamination of 72 patients was that the proportion of successes was greatest in the cases in which a clean sweep of all the tonsillar structures had been made. The question is often asked: May tonsillectomy prove actually injurious as well as failing to relieve the symptoms for which it is undertaken? Unfortunately, the answer can not be emphatically in the negative. In one of Norsk's cases tonsillectomy stirred a latent infection into activity, the operation being followed by a severe septic disease involving the joints and heart and crippling the patient for several years. Some 40 of Norsk's patients wrote complaining of symptoms suggestive of pharyngitis; it is conceivable that this condition may have existed before the operation, having been masked by the more troublesome symptoms associated with the inflammation of the tonsils. It is certainly significant that atrophic pharyngitis was not found in any of the 72 reexamined patients. Three wrote that their capacity for singing had been impaired, and Doctor Norsk is evidently well advised in not recommending tonsillectomy for professional singers if the operation can possibly be avoided.

John Dalton, an English schoolmaster, something over a hundred years ago, put the atom upon a solid theoretic basis and set modern chemistry upon its road of extraordinary success. All chemistry since has been built upon that simple and brilliant hypothesis.

To-day, as Dr. Theodore W. Richards, of Harvard, recently portrayed vividly to the Association for the Advancement of Science, the chemist has broken into the atom. Everyone who has a radiolite watch dial is also witnessing the break-up of atoms. Professor Richards, we are told by the *Practical Druggist* of February, 1923, displayed at Cambridge pictures of part of a helium atom sideswiping a hydrogen atom. Precisely such a *mêlée* of rushing particles is taking place in every radioactive substance, according to these newer hypotheses.

The arrangement of these particles—which we can think of as perhaps a millionth of an atom, which is itself a million times too small to be seen by the naked eye—is the subject of much speculation.

The whole atomic theory was never anything more than a hypothesis. Yet it was often loosely spoken of as being in some fashion a law, and scientists who should have known better spoke of the atoms as the indestructible foundation stones of the universe. Now it appears that the atoms are nothing of the sort, that the atoms of some elements, at least, disintegrate and change into atoms of other elements. Instead of a universe composed of hard, indivisible units we have a universe in which these units are themselves a turmoil of forces and particles separating, colliding, uniting.

The atom still exists as much as ever it did, but science has worked inside it and its nature is revealed as a very different thing from what once was assumed. It is a highly important lesson to learn, that scientific knowledge is no fixed and final body of truth built into the universe, so to speak, but only our very human and partial guesses at truth, marvelously achieved by the devoted labor of uncounted students, but necessarily changing, recast, and renewed as each generation slowly increases our store of accurate facts and as each great scientific imagination takes a new leap into that vast, dark unknown which yet remains.

The *Lancet* of February 3, 1923, makes the following comment on an epidemic of zinc poisoning which occurred in England:

“A sudden outbreak of illness occurred recently among the inmates of a large institution near London which indicates the danger which may arise from the use of galvanized-iron vessels for cooking purposes. About 400 persons were served at tea with hot stewed apples. The remainder of the meal consisted of bread and margarine and

tea. Within a few minutes more than 200 of those who partook of the stew complained of dizziness, a feeling of sickness, colic, and tightness in the throat. There was some diarrhea but no double vision. The medical officer at once administered doses of bismuth and chalk mixture, and within a short time most of the sufferers had recovered. Only 10 persons were at all seriously ill, and all of them were able to carry out their ordinary work next day, so that obviously the effects of the poisoning soon passed off. The apples were freshly gathered and were stewed in large galvanized-iron 'skeps,' which were placed in iron steamers. The skeps were used because it had been found on a previous occasion that the apples became black if placed directly in the steamers. A chemical examination of some of the stewed apples remaining over from the meal showed that they contained 7 gr. of zinc, expressed as zinc oxide, per pound—this being equivalent to 25 gr. of hydrated zinc sulphate to the pound. The emetic dose of zinc sulphate is 10 to 30 gr., and each person consuming the stew may be assumed to have taken 18 to 20 gr. of sulphate of zinc.

It is well known that vegetable acids are prone to act on metals, and the cause of the outbreak in question hardly seemed in doubt from the first. Expert scientific opinion states that vessels of galvanized iron should never be used for containing food materials, in view of the solvent properties which many of these possess for zinc. It seems well that the general public should be aware of this fact.

There is probably no counsel given by the physician to his patient in need of out of doors which is carried out with so many variations as is the advice to "take up golf." Nor does the playing of the game theoretically perfect for aiding in restoring physical and nervous balance always result in the most salutary benefit. Many of the difficulties attending the playing of golf have to do with a lack of coordination on the part of the player, and this is often influenced by habitual foot strain. Dr. N. D. Mattison, writing in the New York Medical Journal of February 7, 1923, on Foot Strains in Golf, contributes some thoughts on this subject which are worthy of consideration. He says in part:

"The average person thinks little, and apparently cares less, about his feet, so long as they carry him reasonably well through the activities of the day and do not trouble him excessively. He may realize that he walks an average of about 5 miles a day; but he may not be conscious of the fact that in this distance he takes something over 12,000 steps, these latter controlling an aggregate of over 800 tons.

"If this average person happens to play at golf, he interrupts his habitual method (or lack of method) of walking on the hard pave, and changes his usual footwear for shoes which may or may not be best adapted to the purpose. He begins playing by assuming the splay-foot position to which he is accustomed, his feet spread apart sufficiently to give him something of a sense of balance. After surcharging the mind with the many things he is supposed to do or not to do, then follows the attempt to respond to a most exacting demand for coordination. With the feet everted, and when body rotation to the right has reached its maximum (in golfing parlance, the 'top of the swing'), the left foot is bearing the weight imposed on it mainly on the great toe, the outer ball of the left foot not being in contact with the ground at all. Indeed, as will be pointed out later, the stroke is about to be played, as with all the ones to follow, with the feet positioned so as to give them, and resultingly the body, the least possible stability and the greatest stress.

"After playing the stroke, walking is again resumed over a greater or less distance, usually less, under conditions of foot usage totally different from those to which he is accustomed. The feet have continually to adapt themselves to yielding and uneven surfaces, to changing planes of inclination. The usual methods of positioning the feet are followed, according to the required stroke, on to the end of the game. At no time have the feet been so placed that they are best adapted to the control of body weight, to the rotation of the torso, to counterbalancing the movement of the arms, and to the application of force. The reason for this will also be demonstrated later. Briefly, in order to attain the maximum of strength and stability each foot must be positioned and used so that the weight is controlled within the foot, along a plane projected forward from the center of the heel and passing through the second metatarsal bone. In the everted, splay foot, this plane passes to the inside of the great toe, with resulting stress imposed on the transverse arch of the foot, and inhibition of forefoot action.

"Indeed, it is doubtful if the vast accumulation of inhibitory influence, as these affect pedal equilibrium, can at once be adjusted to adequate controls. Feet that are weakened from habitual misuse and neglect, feet that are chronically strained, are not readily adapted to the exacting demands of golf, the playing of which serves only to accentuate the degree of weakness and strain already existing. Is it small wonder, then, that a game so potent of good for the many thousands who play it brings often only a modicum of health, benefit, and enjoyment? So far as concerns the lack of muscle balance and of pedal equilibrium, mute evidences of some degree of foot dysfunction which so many bring to the playing of

the game, it would appear that there is something radically and persistently wrong which needs correction."

The writer offers the following method to attain correct control and coordination:

"By positioning the feet at the beginning of every stroke—long, intermediate, or short—so that the ties (anterior tarsal arch) of the weight-bearing triangle of each foot shall be in the same plane, and therefore in alignment, and with the feet separated only enough to maintain equilibrium during the stroke; in other words, the inner margins of the feet at all times form a parallel with each other, the feet being in alignment.

"Thus, under all conditions of play, inclusive of the walking between strokes, the maximum of stability is attained with the least possible joint and neuromuscular stress, whether this have to do with the body or with the feet. The entire left forefoot during right rotation of the body will therefore be constantly in contact with the ground, instead of only the limited base of the great toe alone when the feet are everted. There is no hampering of the pivoting of the body, the lateral sway of the hips is practically eliminated, there is the least possible disturbance to the center of gravity of the body, and there is provided a maximum of force with a minimum of stress and resistance. The power exerted is thereby concentrated and is not dispersed in the efforts to maintain equilibrium. And, finally, the degree of strain is lessened, not only as affecting the feet, but as well there is a lessening of the so-called rheumatic pains, the result of overstress, so often referred to the knee, hip, sacroiliac, and lumbosacral joints as the result of foot unbalance or disturbance of pedal equilibrium."

The following is from the Bulletin of the Milwaukee Department of Health:

"In every epidemic of scarlet fever there are discovered and quarantined large numbers of 'peelers.' These peelers are individuals, mostly children, who are discovered in the course of routine school inspections or accidentally by nurses who visit the homes for some other reason. They are generally peeling upon the hands and feet, and sometimes upon other parts of the body. Such a peeler at once raises the suspicion of scarlet fever. In general, they represent mild cases where the sore throat has been overlooked or dismissed as a case of tonsillitis of mild degree and little consequence, and where the eruption has been present to so slight a degree that it has escaped the notice of the parents. On the other hand, some of them are cases of deliberately concealed scarlet fever, hidden from the

health department for the purpose of escaping quarantine. In a mild epidemic such as the present scarlet fever epidemic in Milwaukee peelers are very numerous.

"The significance of the peeler is that he goes about unsupervised and unquarantined until accidentally discovered. It has been previously stated in this series that mild cases of scarlet fever can and do give rise to severe cases. Bearing this in mind, it is obvious that a peeler can be the source of many cases of scarlet fever, and of some deaths due to this disease. In so far as the peeler himself is concerned, he is subjected to the risk of the complications following in the wake of scarlet fever, because he is not being cared for in the proper manner. These complications include inflammation of the kidneys, middle-ear disease, with resulting deafness, infections of the eyes, nose, and nasal sinuses, enlarged glands, and sores and ulcers of various kinds.

"These peelers are in a contagious stage and are spreading the disease. It will therefore be seen that in the presence of an epidemic of scarlet fever especially, all children whose skin is peeling from the hands should be excluded from contact with other children until such time as it has been definitely determined that their peeling is not due to scarlet fever. In this case the burden of proof that it is not scarlet-fever peeling should be placed upon the patient and the community protected in the meantime by the isolation of the peeling case."

Syphilis of the lung is more common than formerly believed. With the discovery of the spirocheta, the Wassermann blood test, and the use of the X rays our knowledge of pulmonary syphilis has been greatly advanced.

The pathology of lung syphilis is better known than its clinical manifestations. A latent form is encountered at times in which gummata may be present. These give no signs or symptoms. The patient may appear to be in good health and well nourished, or may complain only of a slight cough. Upon careful physical examination a slight area of dullness may be the only discovery, and the X rays show a typical shadow near the hilum. In considering the cases with trivial lung findings and other definite lesions of syphilis one should be careful not to overlook these pulmonary manifestations nor consider them lightly.

The diagnosis of pulmonary syphilis has to be made by exclusion, as there is nothing absolutely characteristic in the clinical history or in the physical signs.

Virchow stated "some patients die of so-called tuberculosis for lack of antisyphilitic treatment."

The main points in the differential diagnosis may be tabulated as follows:

<i>Tuberculosis.</i>	<i>Syphilis.</i>
Attacks the apex first, then the apex of the lower lobe.	Attacks the hilum first, then the base.
Progresses along a certain route.	Progress not constant.
Tends to cavitation.	Tends to fibrosis.
Cavities due to destruction, may be bronchiectatic.	Cavities usually bronchiectatic.
Rarely causes stenosis.	Often causes stenosis.
More common, less circumscribed, and bilateral.	Less common, circumscribed, and unilateral.

The X ray is invaluable in the diagnosis of pulmonary syphilis, frequently revealing the flame-shaped shadow about the hilum, with the fibrous strands running out along the septa. If the disease is not recognized early, death may result from general weakness or from complications. Syphilis and tuberculosis may coexist in the same individual, but the differential diagnosis offers no insurmountable obstacles.

The treatment of pulmonary syphilis is the same as for syphilis in any other part of the body.

The following remarks on some unusual procedures observed in the nose and throat department of the Massachusetts General Hospital are taken from the report of a naval medical officer who recently received postgraduate instruction at Harvard University:

"Tonsils and adenoids, as a rule, are removed under a general anesthetic with the patient in a sitting position. Anesthesia is induced in the usual manner, and then the patient is placed in a specially constructed chair and held in the sitting position by straps, the head being supported by an assistant in whatever position desired. In like manner practically all operative procedures upon the nose and the accessory nasal sinuses are carried out. This position is of advantage to the operating surgeon especially in intranasal work, as the head of the patient is in the position to which the nose and throat specialist is accustomed when making routine examinations, the head of the patient can be quickly and easily adjusted, making the different regions of the nose and throat more accessible and more easily seen than when the patient is in the recumbent position on an operating table.

"In the intranasal and sinus operations, a postnasal plug of gauze is used to prevent blood and secretions from entering the pharynx and larynx. In the radical operation on the antrum an additional plug consisting of a gauze pad is placed inside the cheek.

"In tonsillectomies and other operations of the pharynx a suction apparatus is employed to prevent blood and mucus from entering the larynx. The suction apparatus is not always satisfactory and the sitting posture appears to be one of the predisposing factors to postoperative pneumonia and lung abscess, as it favors the gravitation and aspiration of foreign material into the bronchi.

"In peritonsillar abscess a small incision is made through the plica at the upper pole of the affected tonsil, a blunt dissector is then introduced into this incision and swept around the upper pole of the tonsil separating it from the supratonsillar fossa and its attachment here to the anterior and posterior pillars. Pus is usually recovered from this area and is usually under pressure. In some cases it is necessary to extend the dissection down along the margin of the posterior pillar before pus is recovered.

"The Boston method of tonsillectomy is used in this clinic. The technic observed was as follows: The tonsil is seized with a tonsillar grasping forceps and sharply retracted toward the mid line of the pharynx, plica and pillars thereby being placed on the stretch. An incision is then made through the plica to the capsule. This incision is made at the junction of the plica and the anterior pillar. A blunt dissector is then introduced into this incision and is carried down to the base of the tongue anteriorly and then swept up over the upper pole of the tonsil and posteriorly along the border of the posterior pillar. The tonsil snare is then used to complete the dissection of the tonsil and free it from its fossa with the capsule intact. Hemorrhage is controlled by pressure with a gauze sponge. The pharynx is kept clear of blood and mucus by the suction apparatus. If pressure fails to arrest hemorrhage, the bleeding point is grasped by a haemostat and a suture applied.

"The usual technic is used in submucous resection of the septum except that nasal packs are not used unless necessary to check hemorrhage. Several cases of submucous resection of the nasal septum in which no packs were used were observed; one of which developed a hematoma of the septum. I was informed that it was seldom necessary to pack the nose following this operation to check hemorrhage and that hematoma of the septum was a rare occurrence. In those cases that required packing, an ordinary finger cot filled with gauze is inserted into each nostril and allowed to remain for 24 hours. If the operation is performed under general anesthesia, a postnasal plug is used to prevent blood and secretions from entering the pharynx during the operation. The nasal packs are tied together anteriorly to prevent the patient from aspirating them into the larynx while coming out from the anesthesia. This procedure was adopted in this clinic as the result of a death reported from the aspiration of one of the packs into the trachea. In this case,

tracheotomy was immediately performed; but the patient died from asphyxiation, as the pack had lodged at the bifurcation of the trachea and could not be removed quickly enough to prevent death."

It is well known to sanitarians that the death rate from tuberculosis in the United States, in Great Britain, and in Germany has been falling in a fairly uniform manner from a time earlier than Koch's discovery of the tubercle bacillus till the outbreak of the World War. This has made some thoughtful people doubt the claims of organized public and private health agencies to the effect that reduction of tuberculosis has been largely due to or, at least, has been very materially increased by the campaigns of education and enforcement, of early diagnosis, notification, early treatment, segregation, pasteurization of milk, infant welfare, correction of malnutrition, etc.

Some evidence has been published tending to show that where the education and organization of a community to prevent tuberculosis has been thorough and where the conditions of housing, industry, and economic independence have been favorable, the death rates from all forms of tuberculosis have fallen more rapidly than they have elsewhere, even taking into consideration all factors of age, sex, and race composition of the communities concerned.

In the past 50 years there has been a fall of 77.9 per cent in the tuberculosis death rate in New York City, in the past 11 years a fall of 51 per cent, and in the calendar year 1921 a fall of 18.1 per cent. Haven Emerson, writing in the *American Review of Tuberculosis*, of June, 1922, on the fall in the tuberculosis death rate in the past 5 years in New York City, suggests that among the possible causes in the decline in the death rate from tuberculosis are (1) those intentionally directed as *specific measures* against the distribution of the tubercle bacillus from the diseased to the well; (2) those that are *accessory* and tend to affect the general bodily resistance of those particularly exposed or susceptible, or are intended to inform the public so that intelligent self-protection may become more general; and (3) those events, social, economic, and, so far as the anti tuberculosis campaign is concerned, quite *accidental*, in which we may see an unsought, unplanned, and unexpected bearing upon tuberculosis.

The following are specific measures adopted generally by public health services in most of the States of this country, and perhaps even more effectively by many of the cities, with the direct object of reducing the dosage or distribution of the tubercle bacillus, the frequency of exposure to infection or reinfection, and specific predisposing factors in conditions of employment:

"1. Early and accurate diagnosis of all forms of tuberculosis, and especially of the pulmonary form, at special public dispensaries as well as by the private practitioner of medicine.

"2. Bacteriological diagnosis of specimens of sputum from those suspected of having pulmonary tuberculosis.

"3. Notification of tuberculosis as a communicable disease to the officers of public health.

"4. Segregation in a manner to diminish if not wholly to prevent the distribution of the tubercle bacillus from those with 'positive sputum' to others during the active or open carrier stages of the disease. This includes sanatorium treatment, or its equivalent, under skilled medical and nursing direction, of those in the active stages of the disease, whether showing positive sputum or not, to abbreviate periods of activity or relapse, and to accomplish early and more nearly permanent arrest of the disease.

"In addition to the humane contribution to treatment, cure, relief, and postponement of death made by the tuberculosis sanatorium and the segregated treatment of the consumptive apart from other sick bed patients in hospitals, this resource has meant to the sanitarian the same logical protection of the family, the public, the fellow workman that has been attempted in the communicable diseases as soon as knowledge of the infecting agent and the probability of personal contact transmission were established.

"5. Home nursing services for the education of families in which one or more cases of tuberculosis are under the care of a private physician or dispensary, so that the resistance of the members of the family may be raised to and maintained at a level which will reduce the probability of development of active stages of the disease, and that the infectious discharges of the patient in the form of sputum spray and saliva and in eating and toilet articles often used in common may be promptly destroyed or rendered innocuous.

"Supplementing sanatorium or institutional segregation of tuberculosis patients, with its valuable educational effect upon the standards and subsequent manner of living, the home services of the nurses who care for the sick and educate the patient and his family in the meantime, as well as of those who serve exclusively the so-called public health or administrative and educational functions of this profession, have been powerful means of preventing the infection of many members of the immediate household of the bedridden or sick consumptive, who would not or could not accept or obtain other care.

"Perhaps as agents of discovery, to search out hidden, disregarded, neglected spreaders of the disease, the visiting nurses have done their greatest service. The success of any community organization for the control of tuberculosis depends upon the energy, activity, and ingenuity of the nurses in finding, bringing to diagnosis, and

following up all possible tuberculous patients. Since 1909 the visiting nurses from the public tuberculosis clinics in New York City have made 900,000 separate home visits on tuberculosis patients.

"The extent to which the community has been taught to respond to the suggestion of the nurse that dispensary supervision, or at least diagnosis, is desirable is seen from the increase in the number of patients who apply for dispensary care and who are not found to be tuberculous.

"6. Enforcement of laws and ordinances designed to reduce the habit of spitting in public places, where the opportunities are great for the fouling of shoes, clothing, and articles of common use by discharges from the respiratory tract.

"7. Enforcement of laws and ordinances forbidding the common use of such articles as drinking cups, eating utensils, towels, etc.

"8. The compulsory pasteurization of milk and milk products, except such as come from herds or cows proved to be free from tuberculosis.

"Of this great step forward in communicable disease control we can speak with confidence and present some evidence pointing to its specific value. Reduction of other forms than pulmonary tuberculosis had not occurred *pari passu* with the latter's steady fall in New York City until after the consistent enforcement throughout the city of the sanitary regulations requiring that all milk, except such as is shown to come from cows free from tuberculosis and is otherwise of a high quality and produced and distributed under cleanly conditions, must be pasteurized before it is sold to the consumer. Since this time, in 1914, there has been a notable change in the rate of reduction of the nonpulmonary forms of tuberculosis in this city. In 1914 the rate was 27, in 1921 it was 14 per 100,000.

"That much of the lymphatic, bone, and joint tuberculosis has been of bovine origin is admitted and, as a specific instance of the change since the general pasteurization of 98 per cent of all our city milk supply, instead of finding 64 per cent of a series of 100 cases of tuberculous adenitis to be of bovine origin, as was the case in 1912-1913, only 16 per cent of a series from the same hospital source were found to be of bovine origin in 1917 by Dr. W. H. Park. Whether or not adult pulmonary tuberculosis has been affected by reduction of the tubercle bacillus content of milk, the reduction of milk-borne bovine lymphatic tuberculosis of children is an accomplishment of great and lasting importance.

"9. Exclusion of parts or all of the carcasses of animals slaughtered for food purposes in which gross tuberculous lesions are found before or after slaughtering.

"10. Examination and exclusion of those found to be suffering from active or open tuberculosis from industries concerned with the handling and serving of food.

"11. The control of flies, especially in homes and in hospitals or sanatoria, where active open cases of tuberculosis are under care, and where food is prepared or served.

"Of the innumerable accessory factors more or less definitely recognized as instituted for the particular purpose of preventing tuberculosis by protecting the individual at various ages and under many conditions against unfavorable conditions of livelihood, environment, and nutrition the following appear to be of special importance and to constitute on the whole those of definite value:

"1. Reduction in infant mortality, and in particular the maintenance of the nutrition of infants by breast feeding, unless the mother is tuberculous.

"2. Nutritional protection and assistance for children, in particular from two to six years and in general for all children until they have attained maturity or have left school control.

"3. Open-air classes for anemic, undernourished, and pretuberculous children.

"4. Education in the principles of healthy existence and the natural laws upon which growth and development and vigorous maturity depend.

"5. Housing or tenement-house reform, including control of the number of persons who may legally occupy certain premises, rooms, or apartments for residence purposes, and of the extent and character of gainful occupations that may be engaged in in living premises.

"6. The elimination, by enforcement of laws or by trade regulations and agreements, of those conditions in industry which have been shown to contribute by mechanical or technical injury of the respiratory tract to the development of tuberculosis among industrial workers.

"In considering the following as accidental factors, it is intended to convey the impression that although they either have had or have been thought to have had a definite and, in some instances, a major influence upon the death rate from tuberculosis in New York City within the past 10 years, with one exception they were not developed with the object of reducing tuberculosis, but rather they proved to be social and economic events of a character to cause a reduction of the disease, which always reflects in its prevalence the great movements of races, changes in wealth and in industry, and pandemics of other diseases.

" 1. Racial changes in our population due to unrestricted immigration of the Jewish people, especially from Germany, Russia, and Poland up to 1914, and the limitation of all immigration since that date and more particularly since 1917.

" For many years past the tide of immigration to the United States has left within New York City and State not less than 17.7 per cent of all those of foreign stock making their homes in this country, while during this same period New York City's population has represented but 9.9 per cent of the Nation's whole population. Within the past 25 years, and particularly since 1900, the most notable racial change in the city of New York has been the increasing percentage of those of Jewish stock coming earliest from Germany, and latterly more particularly from Russia and Poland, so that the predominant foreign stock in some boroughs of the city and in large areas of the largest three boroughs of New York has been the Jewish.

" With their fertility and low infant mortality, they have increased rapidly after settling here, and their notoriously low death rate from tuberculosis can not fail to have made an important contribution to the falling rate in the community as a whole.

" Since 1914, war and restriction of immigration by Federal statute have, except for a short period (1919-20), somewhat reduced the flow of the Jewish people and of many other stocks with a much less favorable racial tuberculosis death rate.

" It is probable that some of the superiority of New York City's tuberculosis experience as compared with that of other cities, such as Philadelphia and Boston, is due to the effect on its population of the influx of a larger proportion of the Jewish people of European countries, who are blessed with a much greater resistance to the disease than is the case with the Irish, German, Italian, or native-born American stocks.

" 2. War service, by putting under favorable conditions of hygiene and nutrition many men of 21 to 31 who had never had the benefit of such care.

" 3. Expansion of industry, high wages, shorter hours, more continuous employment (1915-1919), with resulting increase in expenditures for housing, food, and clothing.

" 4. Prohibition, limited July, 1917, general January 16, 1920.

" From a time many years before the war until the entry of the United States into the struggle there had been a steadily increasing opinion, lay and medical, in favor of moderation in the use of alcoholic beverages and a conviction that its place as a stimulant or medicament had been greatly overstated in the past.

" Prohibition first confined in its application to men in uniform, and later generally effective because of the necessary limitation in the use of foodstuffs for the manufacture of alcoholic beverages,

and finally by the application generally of the constitutional amendment on January 16, 1920, has caused the most important alteration in dietary habits that has been experienced in this country. Furthermore, the discontinuance of legal commercial traffic in alcoholic beverages for other than medicinal purposes, which formerly involved an expenditure by the consumers of approximately \$2,500,000,000 a year, has released most (probably four-fifths) of this amount for other purposes—for savings or for improvement of the quality of housing, clothing, and food. That much of the money formerly turned into the saloon has gone to the purchase of more and better clothing and food for women and children of wage earners has been the testimony of the dry-goods and grocery stores since prohibition went into effect.

“There is no sufficient evidence to offer to the effect that the discontinuance of the use of alcohol by the tuberculous or by those of the particularly susceptible types or races has caused a higher grade of resistance to the disease, but all our experience with the disease tends to show that better housing, clothing, and food have resulted in more resistance to tuberculosis. It is unnecessary to invoke the probable decided advantage of not having alcohol constantly affecting the circulation, the digestion, the nervous system, and the resistance to various infections of a large portion of the population, in view of the more prominent economic effects upon the manner of living which have followed beneficially upon the release from the wastage of expenditures for alcoholic drinks.

“That prohibition has by indirection elevated the standard of living by prolonging the period of prosperity and by neutralizing the effects of the years of nonemployment and that women and children have benefited by the investment of the weekly wage of the man of the family in food and maintenance instead of in liquor can, it is believed, be maintained with entire justice.

“Prohibition, or prior to that a great reduction in the general use of alcoholic beverages, is believed to have shared with general prosperity to a great extent in causing the fall in the tuberculosis death rate since 1914.

“5. Influenza, 1918–19.

“A study of the weekly mortality returns of New York City during the periods of influenza prevalence shows less than the usual seasonal increase in deaths from pulmonary tuberculosis for the times of year and a relative drop in tuberculosis death rate coincident with the tremendous increase in deaths from influenza.

“From knowledge of the conditions which prevailed at the time one can not help suspecting that deaths occurred due to influenza which masked, or at least permitted, a preexisting pulmonary tuber-

culosis to go undiscovered, with the result that many who would have died of pulmonary tuberculosis within the past four years and have been reported as such died of influenza without record of the simultaneous tuberculous involvement.

"Only a more detailed study of changes in tuberculosis death rates among those age groups chiefly affected by influenza will bring a conclusive answer to the suspicion that influenza did play a part in the recent reduction in tuberculosis mortality and that part of this effect is due to the errors in certification of deaths inevitable during such a catastrophe."

A deadly poison in the hands of a person not fully aware of the danger inherent in it, or lacking intelligence and skill to guard against the hazard, is as much to be feared as dynamite. Manufacturers and distributors of such poisons who entrust them to ignorant and unskilled persons should be held jointly responsible with the users for the consequences. A community that permits the sale of a deadly poison to any adult who represents that it is to be used for a lawful purpose, without requiring him to show that he knows how to safeguard against danger inherent in its use, must hold itself, too, responsible for the results. And communities, manufacturers, distributors, and users may all consider seriously the recent deaths of six persons in Chicago as the result of fumigation with hydrogen cyanid. On the night of March 3, the owners of a basement restaurant in Chicago turned over the restaurant to a man engaged in the extermination of insect pests, to have the roaches destroyed by him. This he undertook to accomplish by fumigation with hydrogen cyanid, generated by the interaction of sulphuric acid and a sodium cyanid solution. The operator claims that he sealed all openings leading from the restaurant into the upper stories of the building, which were used as residential flats, and that he warned the occupants to keep their windows open during the night. After the tragedy that followed, however, it was discovered that an opening through which a water pipe passed had been overlooked, and not sealed, and that the windows of the apartment on the second floor had been closed. The hydrogen cyanid leaked from the restaurant into the apartments above, and six of the occupants lost their lives. One man escaped, who happened to sleep, fortunately, near an open window. Hydrogen cyanid has been extensively used in the disinfestation of ships, grain elevators, greenhouses, and storage warehouses, and in Army camps. Always the strictest precautions have been used, and recently those engaged in the work and liable to come within range of the fumes have been equipped with gas masks. To a certain extent, hydrogen cyanid

has been used for the disinfection of dwelling houses and apartments possibly more frequently than has been commonly recognized, for often the extermination of insects is undertaken on a commercial basis by persons who do not disclose the nature of the method used. Here and there a community, possibly awakened by a tragedy such as has just occurred in Chicago, has passed regulations to safeguard its people against such dangers; but generally, beyond limiting the sale of such deadly poisons as sodium cyanid and hydrocyanic ("prussic") acid to adults buying them for lawful purposes, no restrictions have been imposed. The seriousness of the situation is shown with tragic force by the accident in Chicago. The health authorities of the country should recognize the danger and take precautions against it, without waiting for deaths to occur within the communities which they serve.—*Jour. A. M. A.*, March 10, 1923.

The first abstract of proposed changes for the tenth revision of the United States Pharmacopœia, covering most of the organic and many inorganic chemicals, has been issued by the committee of revision. Anyone interested in the new U. S. P. standards may receive a copy of this abstract upon request. The committee of revision invites comments or criticisms at this time, that the maximum degree of perfection may be obtained in the revision. Requests or comments should be addressed to the chairman of the committee, Dr. E. F. Cook, 636 South Franklin Square, Philadelphia, Pa.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,

U. S. Naval Medical Bulletin,

Bureau of Medicine and Surgery, Navy Department,

Washington, D. C.

For review.

Books received for review will be returned in the absence of directions to the contrary.

Books are masters who instruct us without rods, without words or anger, without bread or money. If you approach them, they are not asleep; if you blunder, they do not scold; if you are ignorant, they do not laugh at you.—Richard deBury.

TEXT-BOOK OF OPHTHALMOLOGY, by *Hofrat Ernst Fuchs*, former professor of ophthalmology in the University of Vienna. Authorized translation from the twelfth German edition with numerous additions by *Alexander Duane, M. D.*, surgeon emeritus, Knapp Memorial Hospital, New York. Seventh edition. J. B. Lippincott Co., Philadelphia, Pa., 1923.

This book needs no introduction to the naval medical officer, as it is the standard work on ophthalmology issued to the service. It is noted that in the preparation of the new edition the text has been entirely rewritten and rearranged.

Referring to the revision in the preface, Doctor Duane says:

"The chapters on refraction have been entirely remodeled and much augmented. Considerable changes also have been made in the sections on motility and various alterations and additions in the sections on the light sense, color sense, perimetry, and functional and objective examination—the attempt having been made to bring these subjects down to date in all particulars. Among the subjects added in these special parts of the book are a fuller discussion of heredity, Von der Hoeve's theory of the origin of cataract and senile macular

degeneration, the newer applications of heat and radiotherapy, massage, and hypertonic solutions; notions of the wave theory of light, the theory of prisms, the composition of lenses from prisms, the laws governing the formation of images. Gullstrand's observations on the character of the images in astigmatism and the structure of the lens, the cardinal points of lenses and the eye, a new table of accommodation, the evolution of ametropia, and a more extended consideration of the determination and treatment of refractive errors; complete revision of the sections on color vision, with many additions on the physical basis of color vision, color mixtures, and perversions of color sense; revision of the section on the light sense, including Percival's method of light-sense testing; numerous additions on the subject of perimetry (especially the perimetry of glaucoma); complete revision of the sections on fixation and binocular vision, with many other changes in the sections on motility; a much fuller presentation of the paths of the pupillary reflexes and of the visual paths, a considerable revision and additions to the section treating of the methods of objective examination, including paragraphs on the slit lamp, contact illumination, examination with red-free light, etc.

"In the part treating of special diseases almost every page has been revised. Some of the more considerable changes will be found in the articles on trachoma, inclusion conjunctivitis, ulcerative keratitis, *ulcus serpens*, *pannus degenerativus*, corneal and scleral *ectasias*, anomalies of the anterior chamber and of the vitreous, the classification of iritis, the description of the varieties of chorioiditis and retinitis, the theory and treatment of glaucoma, and in all parts in the matter of treatment. The part on operations has also been largely revised, the specific additions comprising, among others, Francis' method of removing superficial tumors, Wheeler's operation for a new socket and for blepharoplasty, a variety of the other plastic operations on the lids, some of the newer operations for keratoconus and staphyloma, a much fuller description of trephining, the indications for the glaucoma operations, sclerectomy for detachment, fuller description of the Reese resection, Wootton's advancement, the indications for muscle operations, fuller descriptions of the substitutes for enucleation. A number of new illustrations have been added. With all these changes the attempt has been made throughout to preserve the spirit and wherever possible the words of Doctor Fuchs, whose genius gave the work an impress quite unique and whose unerring judgment make it remarkable alike for the breadth and depth of its information and for the balance and coordination of its separate parts."

ORTHOPEDIC SURGERY, by *Sir Robert Jones, K. B. E., C. B., director of orthopedic surgery, St. Thomas's Hospital, lecturer on orthopedic surgery, Liverpool University, and Robert W. Lovett, M. D., F. A. C. S., professor of orthopedic surgery in Harvard University.* William Wood & Co., New York, 1923.

In the preparation of this book the authors, as they tell us in the preface, have endeavored to give the practitioner and the medical student a plain and practical account of those pathological conditions which they believe may properly be classified under the unsatisfactory name of orthopedic surgery and in apportioning the space which should be allotted to each of the different subjects they have been inclined to consider more fully those subjects which had not, in their opinion, received adequate consideration in other works of this nature, and to emphasize those which seemed to them from their importance to require more thorough discussion. Throughout the volume, which is a large one, containing 700 pages, it is pleasing to note that the authors have endeavored to use their personal experience in the great hospitals of England and America as the basis of their discussions.

Orthopedic surgery in its present status may be regarded as including the following six subjects:

1. Joints and their affections.
2. Bones and their affections (including ununited and malunited fractures).
3. Disturbances of the neuro-muscular mechanism.
4. Congenital deformities.
5. Static and other acquired deformities.
6. The principles and details of apparatus used in treatment.

The authors have approached the study of each of these subjects in an unique manner. Instead of following the usual textbook method of reciting the characteristics, pathology, symptoms, diagnosis and treatment of each of the different affections, they have considered each of the subjects as a whole so that, for example, in the question of joints and their affections, the reader's mind is refreshed as to the structure and physiology of joints as a whole; their reaction to unfavorable conditions is formulated and illustrations of the reaction to different abnormalities is considered, not as separate entities but as modifications of joint reaction in general; symptoms are regarded as clinical manifestations of pathological conditions and the treatment advocated is based on the demands of the pathological requirements. With this method of approach it will be readily seen that the reader gets a broader and more intelligent point of view than he would get from a mere presentation of a series of apparently unrelated pathological entities.

The first half of the book is devoted to a consideration of the various joints and their affections. The developmental diseases of

bone and the affections of adult bone are admirably presented. There are excellent chapters on malunited fractures, spastic paralysis, muscle training, obstetrical paralysis, congenital deformities, torticollis, and congenital dislocation of the hip. The authors devote much space to anterior poliomyelitis. The various lesions involving locomotion, clubfoot, static deformities of the feet, and scoliosis have not been neglected.

A notable feature of the book is the number of excellent photographic illustrations.

CLINICAL LABORATORY DIAGNOSIS, by *R. S. Morris, A. B., M. D., professor of medicine in the University of Cincinnati and director of the medical clinic of the Cincinnati General Hospital.* D. Appleton & Co., New York, 1923.

Clinical pathology has undergone a rapid development in the last 20 years. The need of the laboratory in the study of disease is recognized and the value of laboratory methods is appreciated by the general practitioner. This book has been prepared for the general practitioner in order that he may do his own laboratory work, or at least intelligently supervise it and interpret the results in the light of clinical data.

The author has given the various laboratory procedures employed in the study of patients, together with much data to assist in their interpretation. The subject matter is adequately treated and includes consideration of the modern methods of examination of the urine, the gastric juice, the feces, the sputum, secretions of the mouth, throat, and nose, conjunctival exudates, the vegetable and animal parasites of the skin, the blood, and puncture fluids. A special chapter on the chemistry of the blood has been prepared by Drs. Raphael Isaacs and David S. Hachen.

The tests described are those which have been found most useful, and the author clearly expresses their limitations and the sources of error which are connected with them. The author's descriptions are clear and succinct. A feature of the book of use to students is the incorporation of lists of the various diseases in which an abnormal finding may occur.

HOW WE RESIST DISEASE—AN INTRODUCTION TO IMMUNITY, by *Jean Broadhurst, Ph. D., assistant professor of biology, Columbia University.* J. B. Lippincott Co., Philadelphia, Pa., 1923.

This book, designed as a brief introduction to the exceedingly technical and apparently limitless field of immunity, has been prepared especially for nurses, and forms one of the series of excellent nursing manuals published by the Lippincott Co. The author's aim has been to put into clear and simple language the main principles of immunity, covering in a general way the most important preventive and curative practices.

The preventive as well as the curative phases of resisting disease are covered under three divisions—antiserums and antitoxins, the various types of vaccines, the tests of an individual's susceptibility or resistance.

Each chapter begins with a tabulated outline, presenting to the student at a glance the main topics included in the chapter and the interrelationships of those topics. Study suggestions are given at the end of each chapter, with review questions, making the book of value to the hospital corpsman who desires an introduction to immunity.

ESSENTIALS OF SURGERY—A TEXTBOOK OF SURGERY FOR STUDENT AND GRADUATE NURSES AND FOR THOSE INTERESTED IN THE CARE OF THE SICK, by *Archibald L. McDonald, M. D., of the Johns Hopkins University*. Second edition. J. B. Lippincott Co., Philadelphia, Pa., 1923.

This book covers the general principles of surgical diseases and the pathological changes which result therefrom. The matter is presented simply, and only general statements are made concerning etiology, pathology, and the indications for treatment. No attempt is made to discuss technical nursing methods, except special indications for their use.

PHYSICS AND CHEMISTRY FOR NURSES, by *A. R. Bliss, jr., A. M. Phm. D., M. D., lecturer on chemistry and materia medica, Grady Hospital Training School for Nurses, Atlanta, and A. H. Olive, A. M., Ph. Ch., Phm. D., lecturer on chemistry, Hillman Hospital Training School for Nurses, Birmingham*. Third edition. J. B. Lippincott Co., Philadelphia, Pa., 1923.

This excellent book has been entirely rewritten and is presented in a new form, so arranged that chemistry and physics can be separately taught within the 20 hours required by the standard curriculum (1922) of the National League of Nursing Education. Hospital corpsmen will find in this book a simple and clear presentation of those portions of the sciences of physics and chemistry which are of special interest and importance to the nursing profession.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

ABSTRACT FROM THE ANNUAL SANITARY REPORT, FLEET SURGEON,
UNITED STATES BATTLE FLEET, FOR THE YEAR 1922.

The health of the fleet on the whole has been very good, affections of the respiratory tract, next to the venereal diseases, being the most noticeable deviation from the normal, although not necessarily cause for admission to the sick list, for many of the cases were mild. These affections, however, produce an appreciable service damage even though its extent is not definitely appraised. The statistics and general history of the individual ships and of the destroyer squadrons and mine force are already in the bureau's possession in the form of regular returns and sanitary reports and need not be duplicated here.

Beginning about February 1, the epidemic of influenza, which was reported at various earlier dates in Europe and the British Isles and eastern cities of the United States, appeared on the west coast. It was first reported in the Puget Sound district, but spread with great rapidity over the entire coast, reaching San Diego about February 15. In anticipation of the rising incidence of this disease the commander in chief of the United States Pacific Fleet issued a warning enjoining special precaution in the interest of the health of the fleet—first to all ships under orders to sail for the Puget Sound Navy Yard, and then to all divisions and ships under his command. Those ships, the U. S. S. *Texas* and the U. S. S. *Oklahoma*, visiting the extreme northern part of the coast suffered the greatest incidence of influenza. The U. S. S. *Pennsylvania*, while at San Francisco, also had a great many cases, and the U. S. S. *California*, the U. S. S. *New Mexico*, and the U. S. S. *Idaho* had a considerably larger number of cases than the normally expected incidence for this disease at this season of the year. This was equally true of the

destroyer and air squadrons at San Diego. Most of the ships on this coast had a few cases which, however, would not have attracted notice except for the pandemic. Fortunately, and by good management also, for it is not just that the Navy should be deprived of the deserved credit for foresight and judgment, our participation was not far-reaching, and all but an inconsiderable percentage of the cases ran a mild course and were of short duration and unattended by relapse or serious complications or sequelæ.

To give some degree of credit to the Navy for its limited participation in the widespread epidemic of influenza is not by way of invidious comparison with civil communities. It is interesting to note, however, what can be done when authority to put preventive measures in force is at hand, when those measures are systematized and can be quickly inaugurated, and when the machinery to make them effectual is merely an extension of the disciplinary control which characterizes a military organization in its daily life.

Wherever preliminary steps had not already been taken because of newspaper information that the disease was spreading, the admiral's warning was the signal for them, and, although the medical department of each ship employed the measures which the peculiarities of its own field of responsibility and experience suggested as desirable, the programs throughout were closely similar and may be summarized as follows:

As far as weather would permit, the per cent of time at work or on pleasurable exercise in the open air as compared with that below decks was increased, as this procedure automatically widened the distance between individuals, and also reduced the factor of exposure to the varying temperatures and chilling drafts of the 'tween-deck spaces. The crews of the various ships were congregated and instructed not only to avoid the imprudence of various kinds of exposure and the danger of infection in close contact on board ship and ashore, but to promptly report to the medical officer for examination and treatment upon the occurrence of trifling indisposition. All cases of slight ailments, particularly of the respiratory tract when fever was present, were immediately put to bed under treatment to conserve and build up their natural resistance. Special attention was given to the general requirements of the physical hygiene of the personnel and sanitary considerations of the ship, such as warm and suitable clothing to protect against inclement weather; sterilization of mess gear; warming of the ship's spaces, particularly in the morning, to get rid of the night's chill and dampness; and proper ventilation of compartments. There was thorough inspections of the personnel to discover those who were in need but had not sought medical care, and the noses and throats of all were regularly sprayed with mild cleansing and antiseptic solutions.

Finally, a large part of the treatment was careful nursing and simple diet. At least one or two days of normal temperature was insisted upon before the patient was allowed out of bed, and several days of convalescence varying from three days to a week before restoration to duty.

The arrival of the U. S. S. *Henderson* on 20 December, 1922, with a draft of men brought from the east coast for the fleet marked the introduction of measles and mumps on the various ships receiving a quota of the draft. Two cases of each of these diseases developed in the draft while the U. S. S. *Henderson* was en route to the west coast, and the fact was reported to commander destroyer squadrons at San Diego as a basis for such action as he might see fit to take in handling his quota of the draft. The communication by radio which he issued to his command advising that measles and mumps were present in the draft of the *Henderson* was picked up by the flagship at San Pedro and the following instructions promptly issued:

(a) To the *Henderson*: "All cases of measles and mumps or suspects in draft should be retained on board for transfer to hospital at Mare Island or to Goat Island, with orders for transfers on recovery in accordance with commander in chief's distribution file * * * by first available Government transportation."

(b) To all ships present, subbase (information): "Owing to presence of measles and mumps among men for distribution on *Henderson* all ships will subject drafts received from her to immediate careful examination for purpose isolating cases or suspects. *Henderson* directed to retain such cases on board, but double check important. As far as practicable on each ship drafts will not be disseminated among crew until after proper period of close observation to detect incubating cases at earliest possible moment. In general, drafts should mess and billet apart but be kept on deck in sun and open air maximum per cent time. Other special precautions, such as disinfection of mess gear, and so forth, also directed."

The details of carrying out the quarantine indicated were properly left to the individual ship, and the plans of control therefore differed according to judgment and facilities. The plans devised by the U. S. S. *Mississippi* and the U. S. S. *Oklahoma* were most complete, but each ship faced peculiar difficulties, and under the circumstances none could be made either theoretically or practically perfect. Before the end of the year all ships receiving drafts from the U. S. S. *Henderson* except the *New York* and *Pennsylvania* had developed one or the other or both of these diseases, from which previously they had been entirely free, and it remains to be seen what the end will be. There seemed no other way at the time of handling the threatened epidemic which the U. S. S. *Henderson* draft constituted;

and as the hospital ship was away undergoing overhaul at Mare Island, each ship faced the need to care for the cases that developed. It is due the ships to say that the situation as it has developed on each one is being handled well, particularly in view of the fact that a mild type of influenza is again prevalent. Scarlet fever has also been introduced into the ships of the fleet by drafts from the San Francisco training station.

The venereal diseases, as in the past, have been the greatest single cause of damage to the personnel of the Pacific Fleet, and this is in spite of the diligent exercise of every approved preventive measure, moral as well as physical. It must be understood that this statement does not embrace reference to the individual prophylactic tubes, as their issue was of too recent a date to have made much impression on the records or to make judgment concerning the effect of their employment deserving of consideration.

It was clearly demonstrated by the work of the field agents of the Interdepartmental Social Hygiene Board that whatever else was done to protect service personnel against venereal diseases, in the long run, immediate results were readable each month in the simultaneously contrary courses of the curves of police activity and venereal-disease incidence. The loss of the cooperative effort of these trained social workers on 30 June, 1922, because of the failure of Congress to appropriate funds for its maintenance, is keenly regretted. They were a constant stimulus to better things in the community to which assigned.

With a view to the reduction of damage to the service because of syphilis the growing usualness of the employment of the dark-field method of arriving at an early diagnosis, thereby resulting in early treatment, is noted with satisfaction in the fleet. It has received and deserves the utmost encouragement, but some of the ships are, as yet, without the facilities. The advantageous results of this method of examining the initial sore have been particularly noteworthy on the U. S. S. *Pennsylvania* and in the destroyer squadrons, where in both cases it was systematized and advanced to its best possibilities by Doctor Wickes.

HEALTH CONDITIONS OF THE NAVY.

As to be expected at this season of the year, health conditions of the Navy are improving. The annual admission rate for the entire Navy for the four-week period ending May 5 was 675 per 1,000 as compared with an annual admission rate of 740 per 1,000 for the previous four-week period. This improvement in health conditions is due largely to the decline in number of admissions for tonsillitis and bronchitis.

The admission rate for measles for the forces ashore has been lower but for mumps it has been about the same. However, there has been little change for the entire Navy in the admissions for either measles or mumps.

The following table gives the annual admission rate per 1,000 for certain communicable diseases for the current month of April, 1923, in comparison with the mean annual admission rates, month of April, for the five-year period 1918-1922, inclusive:

	April, 1918-1922.	April, 1923.
Cerebrospinal fever.....	0.95	0
Diphtheria.....	3.71	.73
German measles.....	1.20	.21
Influenza.....	21.28	35.55
Malaria.....	6.67	7.80
Measles.....	5.64	11.95
Mumps.....	15.21	20.58
Pneumonia.....	6.32	4.16
Scarlet fever.....	2.54	2.08
Smallpox.....	.12	.10
Tuberculosis.....	3.31	2.39
Typhoid fever.....	.03	0

By reference to the above table it will be noted that the admission rates, entire Navy, for influenza, measles, and mumps were higher than might be expected, and that the admission rate for malaria was again higher than the previous five-year norm for the same period. Measles is still present at Hampton Roads but fewer cases are being admitted than previously. Mumps appeared at Hampton Roads in considerable numbers during the month of April. Measles and scarlet fever have been fairly prevalent at the Naval Training Station, San Francisco, Calif., and an occasional case of mumps has also been reported from that station. One case of cerebrospinal fever was reported from the Naval Training Station, San Francisco, on April 14.

Measles, mumps, and scarlet fever have been fairly prevalent among the ships on the west coast. The ships on the east coast have had mumps and measles but practically no scarlet fever.

The incidence of venereal disease for the entire Navy increased during the past month, the admission rate for the four-week period ending May 5 averaging 141 per 1,000 per annum. There has been little change in the admission rate for venereal disease on shore, the admission rate for the four-week period ending May 5 being 76 per 1,000 per annum.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"PITTSBURGH" FOR THE YEAR 1922.**

Upon sailing from Philadelphia on the 2d of October, 1922, the records showed that there were 23 men with chronic syphilis and 4 active venereal cases. It was realized that this ship was bound for ports where prostitution was practiced, clandestinely and otherwise, and that in all probability exposures would take place. Steps were immediately taken to instruct the crew as to the danger of exposing themselves to venereal disease, also as to the use of preventive measures, especially the prophylactic tubes, which are self-administered, and their efficacy and limitations. Two or three divisions were instructed by the medical officer each day in two periods of about 45 minutes. Thirty such periods were used within six weeks after sailing in order to be sure that every man had been thoroughly instructed in simple terms regarding the use of prophylactic measures and the consequences which would follow exposure to venereal disease, the manifestations, complications, and sequelæ of each disease. Lieut. Commander J. C. Parham, M. C., United States Navy, temporarily attached for transportation to Constantinople, Turkey, rendered valuable assistance in this work. With these ample instructions to all men, it was decided that prophylactic tubes would be given out freely and that no other prophylaxis would be mandatory unless so desired by one who had been exposed. In Las Palmas a prophylactic station was established ashore, with an attendant Hospital Corpsman, in charge of the patrol officer. In addition to administering prophylaxis, the Hospital Corpsman made certain observations by visiting houses of prostitution in which men were known to have been exposed. He found that the tubes were not being properly employed, and that often two-thirds of the tubes would remain unused. This was accounted for in most cases by the exposed men being in a state of intoxication.

There were no houses of prostitution in Gibraltar, but clandestine prostitution was practiced. Some men were able to get into small towns which were out of bounds for the liberty parties, and as a result of this 10 cases of venereal disease were contracted during a stay of 20 days.

In Constantinople, prostitution is practiced probably to as great, or perhaps a greater, extent than in any city of its size in the world, clandestinely as well as in houses of prostitution. The Turkish laws requiring registration of those who practice prostitution are excellent, but are not enforced. The records show that there are about 2,600 registered prostitutes, but the number practicing prostitution will probably reach 20,000 or more. It is interesting to note that

during 1922 there were 3,500 cases of venereal disease treated in the venereal-disease hospital in Constantinople, representing 11 nationalities, none of whom were Turks. In view of these conditions and in view of the great number of cases of venereal disease which developed within the first month after our arrival it was necessary to apply more stringent measures regarding prophylactic treatment. All men who exposed themselves were required to take prophylactic treatment upon returning on board, regardless of whether or not the prophylactic tube or other prophylaxis was used ashore. These stringent measures have resulted in a marked reduction in the number of cases of venereal disease. It is not believed that these measures alone have been responsible for the lessened number of admissions, but that the psychological effect upon those free from disease upon learning that so many of their shipmates were becoming infected, had a repressive influence, tending to lessen the number of exposures of causing the exposed man more zealously to apply prophylactic measures. Careful records and observations are being made in order to determine, if possible, the value of self-administered prophylaxis, as well as with regard to the care and treatment of venereal patients on board ship who continue their work, number of days under treatment, complications, and sequelæ.

All active venereal patients are required to use a special mess, and their mess gear is kept separate and sterilized after each meal. All venereal patients under treatment are restricted to the ship and great care exercised in order to see that their treatment is taken regularly and properly. All men with chronic syphilis are kept constantly under observation and treatment. A special card system for stewards, mess cooks, and mess attendants is kept corrected to date, and all men who handle food in any way, as well as barbers, are inspected weekly for venereal disease and for cleanliness of body, clothing, and finger nails. A complete inspection of the entire crew for venereal disease, and of their teeth by the dental officer, was made in November and records made of those who needed treatment and others who needed special instruction regarding the care of the teeth and the mouth. The barber shop is well regulated, and a small electric sterilizer, similar to those used in the sick bay, has been installed and is of great value.

A large part of the crew is made up of men formerly attached to destroyers—a class of personnel whose teeth are especially poor because of the difficulty of getting proper and regular dental treatment as compared with men on battleships or other large types of vessels. Consequently the dental officer's time has been taken up

largely with operations that should have been done in the past, and very little time could be given to preventive measures which should properly occupy most of his time.

**ABSTRACTS FROM THE ANNUAL SANITARY REPORT OF THE U. S. S.
"FLORIDA" FOR THE YEAR 1922.**

When we consider the prevalence of common communicable diseases conveyed by discharges from the mouth and nose, such as tonsillitis and influenza, the sanitary handling of mess gear is realized to be of great importance as a preventive measure. The efficient sterilization of mess gear should always be assured.

On this ship all dishes and tableware are washed by the messmen on the mess tables in dish pans with hot water and soap. The dishes and silverware are then taken in racks to the scullery and the racks immersed in boiling water, in dip tanks, for a full minute. After being drained the racks are placed on the shelves in the scullery until required for the next meal. The routine described is frequently inspected by one of the medical officers. The scullery of the ship is kept in excellent condition. There is sufficient room for proper stowage of all mess gear.

The aluminum type of nested food carriers are used for the general mess. This type of carrier is not of sufficiently rugged construction, a defect inherent in such a soft variety of metal. Through careless handling, the bottom of the unit tends to become inverted, with a resulting groove around the periphery, which is more or less inaccessible for proper cleaning. Such damaged units should be replaced promptly.

It is unfortunate that the pantries of the chief petty officers', warrant, wardroom, and junior officers' messes are not provided with facilities for the sterilization of mess gear. When it is considered that officers' servants usually use officers' mess gear the importance of this matter is apparent. Under emergency or epidemic conditions the ship's scullery can be used, but in the absence of suitable holding racks the time factor renders this impracticable as a routine.

Bedbugs—Measures of prevention.—As is the case with practically all of the older ships, we are almost continuously confronted with the question of extermination of bedbugs. This is not surprising in view of the frequent tendency for bedbugs to be brought back to the ship from lodging houses, cheap hotels, and evil resorts. Every stay in port means the arrival of more bedbugs on board, the number being proportionate to the length of stay. The ship's laundry may act as a distributing center for bedbugs.

One great difficulty in the extermination of bedbugs aboard ship lies in the innumerable breeding places which are difficult of access. The problem in hotels and private homes is an easy one by comparison. The structural conditions of a ship renders this situation more or less inevitable. On this ship it has been a common experience to find nests of bedbugs in large numbers in removing the wooden strips running fore and aft at the edges of the bunk frames. Another common location for breeding is inside of the coils of the bunk springs. There is one feature of the bunk construction in the chief petty officers' bunk space and in the sick bay which calls for special comment. The bunk frame is assembled from iron piping. The end coils of the bunk springs are secured to the frame by means of hooks passing through holes in the cross members. This arrangement offers ready access of bugs to the interior of the piping where an ideal breeding place is provided. The only method of attack under these circumstances is by means of heat. These cross members should be replaced by an angle iron, as is provided for officers' springs, thus excluding the chance of breeding inside of pipes. Another breeding place is under loosened or curled-up linoleum.

The three outstanding places where bedbugs propagate are officers' staterooms, chief petty officers' quarters, and the sick bay. They are rarely found upon inspection of the crew's bedding. This is probably largely the result of frequent scrubbing of bags and hammocks and the periodic airing of hammock mattresses in the bright sun. In other words the conditions for breeding among the men's effects are very unfavorable.

Former medical officers have strongly recommended fumigating the entire ship with hydrocyanic gas to eliminate bedbugs. This matter was taken up by the writer with the chief quarantine officer of the United States Public Health Service at Boston. The fumigation of a battleship with its intricate arrangement of compartments is quite a different affair from the simple matter of handling the holds of cargo ships. There is a certain factor of danger involved and the length of time required is very uncertain. It is even a question whether the gas would penetrate into all nesting spaces in sufficient strength to kill the bugs. It was therefore decided to use other measures.

A routine has been adopted which is giving excellent results. All mattresses and pillows are sterilized monthly at the navy yard dispensary during the overhaul period. At the same time, in the chief petty officers' quarters and sick bay all springs and cross members of bunk frames are flamed; all lockers are carefully inspected; and the linoleum, if loose, is removed from the deck. When

individual cases are reported during the month, the mattress is immediately sprayed with disinfectant and bunk springs and cross-pieces are flamed.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.

WSD/JBC 127507(44).

Serial No. 254-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 23, 1923.

To: All naval hospitals.

Senior medical officer, all yards and stations.

Naval medical supply depot.

Naval Medical School.

Subject: Change in policy of U. S. Employees' Compensation Commission regarding employees suffering from diseases; compensation law held applicable only to accidental injury.

Reference: Letter of U. S. Employees' Compensation Commission, April 16, 1923.

1. The above-mentioned letter is quoted for your information with regard to civilian employees of the United States applying for treatment under the compensation law. (Pars. 1159-1166 and 1910, Manual for the Medical Department, 1922.)

"Reference is made to a recent alteration in policy, perhaps temporary, in regard to the treatment of employees of the United States Government injured in the performance of their duty. This has been made necessary by a recent decision of the Comptroller General of the United States, as explained in the following paragraphs:

"1. From the enactment of the Federal compensation act, September 7, 1916, the commission has construed the term 'personal injury' as used in the law to cover disability resulting from injury by accident and also any disease if directly caused by the employment. However, the Comptroller General of the United States in a recent decision has held that the compensation law applies to cases of accidental injury only.

"2. When the construction of the law which the commission has followed since its enactment in 1916 was questioned by the Comptroller General and the matter was brought to the attention of Congress, the House passed an amendment defining 'personal injury' in the compensation law as including 'disease proximately caused by the employment,' the express object of which was to make the law conform to the construction that had been placed upon it by the commission. In the Senate there was considerable support to this view. Some Senators, however, took the position that the time was insufficient for proper consideration of the question and that it should go over until the meeting of the new Congress in December. It was finally agreed, therefore, in the amending act of March 3, 1923, that the awards already paid by the commission should be allowed to continue until March 1, 1924, unless otherwise determined by the commission, thus giving Congress time to act after more deliberation than was possible during the session which has just closed.

"3. It is expected that the amendment of the law to make clear the intent of Congress with reference to the compensation of disease di-

rectly caused by the employment will be taken up by Congress when it again meets in December. In the meantime the commission does not feel warranted in paying compensation or authorizing any medical or hospital treatment except on account of the results of an accident.

"From the above it will be clear to official superiors that until further notice, employees suffering from diseases alleged to be the result of occupation rather than of accident, should not be referred for treatment on Form CA-18 or for examination on Form CA-17 to Government or designated physicians. For your further guidance in order to more closely differentiate between occupational disease and accident, it may be stated in general that disabilities from single injuries occurring within a relatively brief space of time may be termed accidental and referred for treatment. On the other hand, disabilities arising from conditions of employment distributed over a time in excess of one day must, as a rule, be considered nonaccidental in nature and until further notice can not be referred for treatment or examination. These cases, however, should be reported to the commission on Form CA-2 in order that at a later date they may receive further consideration in case Congress so amends the compensation act next year so as to include diseases of an occupational nature. Claimants are further recommended to forward Form CA-4 for the same reason, if medical expenses have been incurred or wages lost."

E. R. STITT.

Circular letter.
Serial No. 255-1923.

WSD/JBC 124942-0.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 24, 1923.

To: All naval hospitals, continental limits and Pearl Harbor.

Naval medical supply depots, Brooklyn, N. Y., and Mare Island, Calif.

Naval Medical School, Washington, D. C.

Post surgeon, marine barracks, Quantico, Va.

Senior medical officer, navy yards and stations, continental limits.

Subject: Revised schedule of wages for civil employees under the Naval Establishment.

Inclosure: One copy of revised schedule.

1. The wage scales of the inclosed schedule become effective on May 1, 1923, for all civilian employees of the Naval Establishment at Medical Department stations within the continental limits of the United States and at Pearl Harbor.

2. No change is made in rates of pay for employees of the Hospital Service, excepted group or reconstruction aide group, but numerous changes appear in the laborer, helper, and mechanical service, where a departure is made from the previous policy of uniformity of wage for the same ratings at all stations. Changes also appear in the clerical service.

3. The activities addressed by this letter will immediately submit requests for allotments for the balance of the fiscal year 1923 (May and June) to cover the difference between present pay and the rates effective May 1, 1923 (unless present allotments show a sufficient monthly balance to render an additional allotment unnecessary, in which case report will be made to that effect). The requests will show the increase required under each subhead, as well as the total increase and increase in monthly allotments.

4. Separately, and not later than ten days from the receipt of this letter, all activities will submit new requests for allotments for the fiscal year 1924, covering pay of the civil force under "Maintenance and operation (labor)" and "Administration (clerical)." In submitting these requests, the distribution of

employees under each subhead will be shown in the following form, calculations being based on maximum pay:

	Pay per month.	Total.
(a) Transportation:		
3 chauffeurs.....	\$106.08	\$3,818.88
1 machinist.....	153.92	1,847.04
		5,665.92
(b) Power house:		
1 engineman.....	160.16	1,921.92
4 firemen.....	122.72	5,890.56
		7,812.48
(c) Commissary:		
1 chief cook.....	110.00	1,320.00
Etc. .		
(d) Laundry:		
1 chief launderer.....	130.00	1,560.00
Etc.		
(e) Buildings and grounds:		
1 chief mechanic.....	228.80	2,745.60
Etc.		

5. Allotments for civil force which have been sent out by the bureau for the fiscal year 1924 (except for reconstruction aide group, or for clerical force where the new schedule makes no change) will be returned for cancellation.

6. Attention is invited to instructions on pages 3 and 20 of the schedule regarding promotion of clerical force under classifications C and D after six months' service. Those now in the service who have served satisfactorily six months or more will be promoted as of May 1, 1923, as follows:

Class D, from \$93.60 to \$104.

Class C, from \$104. to \$114.40.

7. On page 18, par. 31, it will be noted that the increment for supervisory employees remains at 15 cents per hour for chief mechanics and 5 cents per hour for assistant chief mechanics, head mechanics, etc. Attention is called to the fact, however, that the pay of these supervisors is not necessarily uniform, but depends on the pay of the basic trade. Thus a chief mechanic at Chelsea, promoted from electrician would receive \$228.80 per month, while if promoted from machinist his monthly pay would be \$178.88.

8. Report will be submitted, with requests for 1924 allotments, on plain 8 x 10½ paper, in duplicate, showing the increased cost of the new schedule for the employees in each rating, arranged in one list by groups, as follows:

GROUP I.

Rating.	No.	Old pay per month.	New pay per month.	Total old pay.	Total new pay.
Janitor.....	2	\$85.28	\$89.44	\$170.56	\$178.88
Laborer.....	1	85.28	89.44	85.28	89.44

Groups II, III, IV(a), and IV(c) will be in the same form, with totals for last two columns.

E. R. STITT.

Circular letter.
Serial No. 256-1923.

JWR:GA 125949(44).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 25, 1923.

To: All naval hospitals.
Subject: Subsistence of Marines.
Reference: M. & S. circular letter, serial No. 205-1922.

1. On account of a difference in the method of obtaining reimbursement for marines subsisted in naval hospitals, the bureau finds it necessary to have additional data entered on the Ration Memoranda, submitted monthly, in accordance with instructions contained in above circular letter (ref.).

2. It is requested, therefore, that hereafter the entries under "Patients" in the columns under "Marine Corps" the number of patients be separated to indicate the number of subsistence days for marines admitted from shore stations and the number of subsistence days for marines admitted from vessels in commission. This can be done by writing after the respective figures the entries "Admitted from shore stations" and "Admitted from vessels."

3. It is also requested that each hospital immediately furnish the above information for each month since September, 1922, that the bureau may correct reports already forwarded for those months.

F. L. PLEADWELL, *Acting.*

Circular letter.
Serial No. 257-1923.

WEE:SS 124680(44).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 25, 1923.

To: All medical officers.
Subject: Vaccination records.

1. Attention is directed to section V of chapter 14 on page 224 of the Manual for the Medical Department, 1922, paragraphs 2301 to 2304. It is desired that all medical officers shall comply with the provisions of these paragraphs.

2. It has been brought to the attention of the Bureau that men are received at training stations and elsewhere from other training stations, from ships, and from other places without proper entries being made relative to vaccination both as to cowpox vaccinations and typhoid and antityphoid inoculations. Furthermore, it is reported, and it also appears from records on file in the bureau, that medical officers have not entered the written signature or initials in the vaccination records and abstracts of the health records, but, rather, a rubber stamp has been used. It is desired that medical officers shall sign these records or, if a rubber stamp is used, that they shall initial such records.

3. The bureau desires further to point out the importance of this matter with regard to the health records in that the provisions of law with which the bureau must deal require that careful and specific records be kept.

E. R. STITT.

Circular letter.
Serial No. 258-1923.

WSG 125282-0(44).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 26, 1923.

To: All naval hospitals;
All naval medical supply depots;
Naval Medical School; and
Naval dispensaries, navy yards, at Portsmouth, N. H., League Island, Charleston, Puget Sound, Boston, Mass., Washington, Pensacola, Mare Island, Brooklyn, N. Y., Norfolk, Key West, Cavite.

Subject: (a) Reports of Surgeon General, 1918, 1919, 1920.

(b) Naval Digest, 1921.

(c) Naval Yearbook, 1920 and 1921.

1. By separate inclosure the bureau is forwarding the above-mentioned three publications.

2. The bureau's reports (a) for the three years covering the World War period have been bound into one volume for their better and surer preservation; in consideration of the valuable vital statistics and other important data of the war, available nowhere else, this volume should be carefully preserved in the library, and it should be so marked with the name of the library that it may not be lost.

3. The Naval Digest (b) is being distributed only to the hospitals, depots, and the school; it has been prepared in the office of the Judge Advocate General of the Navy, and is published for use in connection with the Naval Digest, 1916; it should be made so available as to become familiar to all members of the staff.

4. The Yearbook (c) has been supplied to Medical Department activities for many years; it contains all naval appropriations, some naval deficiency appropriations, and much naval legislation, enacted since the beginning of the rehabilitation of the Navy through the act of March 3, 1883; the present volume does not replace those volumes which have preceded it, for the reasons given in the "Prefatory note" on page 3; the full set of these books should, therefore, be preserved.

E. R. STITT.

Circular letter.
Serial No. 259-1923.

WSD/JBC 124942-O.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 27, 1923.

To: All naval hospitals, continental limits, and Pearl Harbor.

Naval medical supply depot, Brooklyn, N. Y., and Mare Island, Calif.

Naval Medical School, Washington, D. C.

Post surgeon, marine barracks, Quantico, Va.

Senior medical officer, Naval Training Station, Hampton Roads, Va.

Subject: Schedule of wages for civil employees effective May 1, 1923, modification of.

Reference: (a) M. & S. circular letter serial No. 255-1923, #124942-O, April 24, 1923.

(b) Alnavsta two, April 26, 1923.

Inclosure: Alnavsta three.

1. Reference (b) reads:

"0526. This Alnavsta applies only to stations within continental limits of United States and Pearl Harbor. Reports from various navy yards have con-

vinced the department that the recent changes in the wages of certain trades in private industrial establishments in various localities since wage data was collected render it advisable that the wage schedules just promulgated which become effective May first be revised. Wage boards will therefore be convened at the various yards to collect new data for groups one, two, and three and recommend a revised scale which will go into effect July first and continue until the first of the year. Pending revision of the wage scale effective May first no reductions will be made from the scale effective September sixteenth, nineteen twenty-one. The proceedings of the wage boards will be under the new regulations being mailed this date 1250."

2. The intent of this order is to make effective as of May 1, 1923, all increases carried in the new schedule, but to suspend the operation of all decreases until the promulgation of an additional revision which will become effective July 1, 1923.

3. Employees for whom the schedule approved April 14, 1923, carries an increase in pay will be advanced to the new rate on May 1, 1923; but where a decrease in pay is shown, or where the rating has been omitted, present pay rates will be continued until the receipt of further instructions. It will be noted that there is no change in the method of computing the monthly pay of employees at hospitals (par. 30 of the schedule), including employees at the sick quarters, Quantico, and Hampton Roads.

4. In submitting requests for allotments for the months of May and June, 1923 (par. 3, ref. a), calculations will be on the above basis, i. e., allow all increases but make no decreases in pay.

5. As it is impracticable to withhold allotments for the fiscal year 1924, until the receipt of revisions in the schedule to become effective July 1, 1923, the allotment requests called for in par. 4, ref. a, will be forwarded, computed on the same basis as allotments for May and June, 1923.

6. The report called for in par. 8, ref. a, also will be submitted.

E. R. STITT.

Circular letter.

CBM-EJP 127039 (51).

Serial No. 260-1923.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., May 2, 1923.

To: All medical officers.

Subject: Vacancies in the Naval Medical Corps.

1. The bureau again desires to call to the attention of all medical officers the shortage of officers in the corps and to urge upon all members of the corps, especially those officers on duty in medical centers and near class A medical colleges, the necessity for renewed efforts to interest young medical men in the Navy.

2. In order that medical officers may be familiar with the situation in the corps as it exists at present, the following information is submitted:

3. Appropriation has been made for 800 medical officers for the fiscal year 1923-24. The present strength of the corps is 746. There are 22 candidates who have qualified for appointment in the grade of assistant surgeon, rank of lieutenant (junior grade), 18 of whom are senior students in class A medical colleges and can not be commissioned until after graduation in June.

4. The last computation, made on November 15, 1921, was based on 815 medical officers, which allowed—

4 rear admirals.

34 captains.

65 commanders.

There are at present in the upper grades of the Medical Corps—

4 rear admirals.

33 captains.

63 commanders.

The bureau is informed that a new computation will have to be made on or before July 1st of this year. Should all candidates who have qualified accept their commissions the strength of the corps would then be 768. Computing on this number the corps would be allowed—

4 rear admirals.

32 captains.

61 commanders.

5. It will be noted, therefore, that unless the bureau is successful in recruiting the corps up to 800 on or before July 1st there will be no promotion in the upper grades, as the present numbers are in excess of the numbers which would be allowed by computing on a strength of 768.

6. Several officers of the corps have done excellent work in securing candidates for the corps from among senior students of class A medical colleges, and it is believed that with a little effort on the part of medical officers on duty in medical centers and in the vicinity of medical colleges a sufficient number of qualified candidates could be secured to increase the number in the corps up to that appropriated for, 800.

7. The bureau has during the past year made every effort to recruit the Medical Corps to the appropriated strength. The Surgeon General has personally addressed about 12,000 letters to physicians within the statutory age limits for appointment, who are graduates of recognized medical schools, and, in addition, has written personal letters to each intern serving in hospitals recognized by the American Medical Association. He has also written personal letters to each member of the senior classes of class A medical schools, conveying information regarding the Medical Corps of the Navy. A plan has been adopted whereby appointees to the Medical Corps direct from medical schools will be assigned to the larger naval hospitals for one year in order to meet the requirement of a year's internship.

E. R. STITT.

N64-GWL 6085-178.

NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., 10 May, 1923.

Bureau of Navigation circular letter No. 31-23.

To: All ships and stations.

Subject: Examination of enlisted men for appointment to the following warrant grades: Pharmacists, gunner (ordnance), gunner (electrical), gunner (radio).

Reference: (a) Bureau manual, chapter 6, Articles D-5100-5849.

(b) N. Nav. 334, report of preliminary examination.

(c) N. Nav. 78, 1919, instructions to examining boards.

1. A competitive examination for appointment to the rank of pharmacist and to that of gunner (ordnance, electrical, and radio) will be held the week com-

mencing 20 August, 1923. Vacancies exist for 17 pharmacists and for 72 gunners (ordnance), 29 gunners (electrical), and 58 gunners (radio).

2. The preliminary examination of candidates, as required by reference (a), shall be held by commanding officers in ample time to permit reports to reach the bureau prior to 15 July, 1923. Applications received subsequent to that date will not be considered. All applications must be submitted on N. Nav. 334 and must be accompanied by a transcript of the candidate's current service record.

3. Eligibility requirements for this examination are outlined in paragraphs D-5118, Pharmacists, and D-5115, Gunners, all classes. In addition, a report of insobriety or unexcused absence committed subsequent to 20 August, 1921, disqualifies any candidate.

4. All officers designated in the Navy Department letter 26251-439 of 11 April, 1921, and supplements thereto, are requested to appoint such boards as may be necessary to supervise the final examination of candidates for promotion. These boards should be convened in ample time to permit the commanding officers of candidates to ascertain before which board candidates shall appear.

5. Particular attention is invited to the provisions of Article D-5132, bureau's manual, in order that sufficient sets of questions may be forwarded by the naval examining board, Washington, D. C. In the case of the pharmacist examination, the questions will be prepared and forwarded by the naval examining board, Naval Medical School, Washington, D. C.

6. In the case of candidates who are serving on unattached vessels or stations, they shall be transferred to a ship or station where a board has been convened for temporary duty in connection with the final examination. They shall return to their regular stations and duties upon completion of this examination.

7. In the event that a candidate is transferred after he has received authorization to appear for examination, the commanding officer will forward the authorization to the candidate's commanding officer so that every opportunity will be afforded the man to present himself before the nearest supervisory board.

R. H. LEIGH, *Acting.*

VITAL STATISTICS.

The "Monthly Health Index," which is published on the 15th of each month, contains the statistical data for individual ships and shore stations. The statistics appearing in this BULLETIN are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{4}{7}$ or $\frac{5}{12}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the month of April, 1923.*

	Forces afloat.	Forces ashore.	Entire Navy.	Marine Corps.
Average complement.....	74,401	41,032	115,433	20,360
All causes:				
Number of admissions.....	3,504	2,996	6,500	1,134
Annual rate per 1,000.....	565.13	876.18	675.68	579.25
Disease only:				
Number of admissions.....	3,127	2,749	5,876	1,005
Annual rate per 1,000.....	504.32	803.95	610.82	513.35
Communicable disease, exclusive of venereal disease:				
Number of admissions.....	481	411	892	192
Annual rate per 1,000.....	77.57	120.19	92.72	98.07
Venereal disease:				
Number of admissions.....	1,058	350	1,408	242
Annual rate per 1,000.....	170.63	102.36	146.36	123.61
Injuries and poisons:				
Number of admissions.....	377	247	624	129
Annual rate per 1,000.....	60.80	72.24	64.86	65.90

TABLE No. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of April, 1923.*

	Forces afloat, Navy and marines (strength, 74,401).		Forces ashore, Navy and marines (strength, 41,032).		Total (strength, 115,433).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases.....	3,127	504.32	2,749	803.95	5,876	610.82
Injuries and poisons.....	377	60.80	247	72.24	624	64.86
Total admissions.....	3,504	565.13	2,996	876.18	6,500	675.68
Class III:						
Appendicitis, acute.....	64	10.32	30	58.77	94	9.77
Autointoxication, intestinal.....	1	.16	15	4.39	16	1.66
Cholangitis, acute.....	22	3.55	12	3.51	34	3.53
Cholecystitis, acute.....	2	.32	1	.29	3	.31
Cholelithiasis.....	1	.16	0	0	1	.10
Colitis, acute.....	7	1.13	2	.58	9	.94
Constipation.....	17	2.74	17	4.97	34	3.53
Enteritis, acute.....	37	5.97	13	3.80	50	5.20
Gastritis, acute catarrhal.....	7	1.13	5	1.46	12	1.25
Gastroenteritis.....	44	7.10	23	6.73	67	6.96
Hemorrhoids.....	14	2.26	20	5.85	34	3.53
Pharyngitis, acute.....	8	1.29	54	15.79	62	6.44
Ulcer of duodenum.....	1	.16	0	0	1	.10
Ulcer of stomach.....	1	.16	0	0	1	.10
Total.....	226	36.45	192	56.15	418	43.45
Class VII:						
Varicocele.....	13	2.10	7	2.05	20	2.08
Class VIII:						
Chickenpox.....	9	1.45	9	2.63	18	1.87
Diphtheria.....	3	.48	4	1.17	7	.73
German measles.....	2	.32	0	0	2	.21
Influenza.....	168	27.10	174	50.89	342	35.55
Measles.....	45	7.26	70	20.47	115	11.95
Mumps.....	176	28.39	22	6.43	198	20.58
Pneumonia, broncho.....	5	.81	18	5.26	23	2.39
Pneumonia, lobar.....	9	1.45	8	2.34	17	1.77
Scarlet fever.....	7	1.13	13	3.80	20	2.08
Smallpox.....	0	0	1	.29	1	.10
Whooping cough.....	1	.16	1	.29	2	.21
Total.....	425	68.54	320	93.58	745	77.44
Class IX:						
Dysentery, bacillary.....	0	0	1	.29	1	.10
Dysentery, entamebic.....	1	.16	0	0	1	.10
Total.....	1	.16	1	.29	2	.21

TABLE No. 2.—*Number of admissions reported by Form F cards for certain diseases for the month of April, 1923—Continued.*

	Forces afloat, Navy and marines (strength, 74,401).		Forces ashore, Navy and marines (strength, 41,032).		Total (strength, 115,433).	
	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.	Number of admis- sions.	Annual rate per 1,000.
Class X:						
Dengue.....	27	4.35	17	4.97	44	4.57
Filariasis.....	0	0	3	.88	3	.31
Malaria.....	18	2.90	57	16.67	75	7.80
Total.....	45	7.26	77	22.52	122	12.68
Class XI:						
Tuberculosis (all forms).....	10	1.61	13	3.80	23	2.39
Class XII:						
Chancroid.....	337	54.35	60	17.55	397	41.27
Gonococcus infections.....	626	100.96	212	62.00	838	87.11
Syphilis.....	95	15.32	78	22.81	173	17.98
Total.....	1,058	170.63	350	102.36	1,408	146.36
Class XVIII:						
Bronchitis, acute.....	143	23.06	321	93.88	464	48.23
Laryngitis, acute.....	7	1.13	33	9.65	40	4.16
Pleurisy, acute fibronous.....	3	.48	4	1.17	7	.73
Rhinitis, acute.....	5	.81	20	5.85	25	2.60
Tonsillitis, acute follicular.....	329	53.06	373	109.08	702	72.97
Total.....	487	78.54	751	219.63	1,238	128.69
Class XX:						
Herniae.....	28	4.52	19	5.56	47	4.89

TABLE No. 3.—*Summary of annual admission rates for venereal diseases reported from ships for March and from various shore stations for the five-week period April 1 to May 5, 1923.*

	Annual rate per 1,000, March.			Average rate since Jan. 1, 1923.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships.....	0	185.42	960.00	25.97	140.98	1,882.35
Battleship and cruiser force—						
Scouting Fleet.....	0	157.81	593.02	65.12	145.73	375.00
Battle Fleet.....	64.39	148.97	464.28	52.41	95.17	464.28
Asiatic Fleet.....	124.35	719.80	832.03	123.71	654.39	832.03
Destroyer squadrons—						
Scouting Fleet.....	0	222.70	857.14	33.52	214.16	1,882.35
Battle Fleet.....	0	167.05	660.55	36.81	105.85	269.23
Asiatic Fleet.....	359.74	359.74	359.74	46.15	211.98	685.71
Miscellaneous—						
Scouting Fleet.....	0	165.17	800.00	25.97	157.72	437.96
Battle Fleet.....	0	199.80	960.00	53.98	141.14	483.22
Asiatic Fleet.....	489.79	574.85	654.54	122.45	592.94	1,371.43

	Annual rate per 1,000, Apr. 1 to May 5, 1923.			Average rate since Jan. 1, 1923.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States...	0	60.62	314.74	0	70.67	215.89
First naval district.....	24.80	40.66	102.30	36.05	41.03	75.00
Third naval district.....	0	35.60	111.23	12.47	46.78	128.74
Fourth naval district.....	62.93	197.61	314.74	90.77	135.81	215.89
Fifth naval district.....	0	56.11	151.16	53.02	68.17	111.41
Sixth naval district.....	0	27.10	29.20	0	33.93	40.44
Seventh naval district.....	68.42	68.42	68.42	19.64	19.64	19.64
Eighth naval district.....	102.97	104.79	216.67	95.44	99.03	99.81
Ninth naval district.....	50.85	50.85	50.85	38.99	38.99	38.99
Eleventh naval district.....	8.67	26.99	106.12	20.00	84.76	146.67
Twelfth naval district.....	63.63	81.13	91.41	54.39	72.82	101.40
Thirteenth naval district.....	0	41.55	73.76	30.69	46.74	81.88

RATIO OF GONOCOCCUS AND SYPHILIS INFECTIONS TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, March.		Per cent since Jan. 1, 1923.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships.....	59.58	9.28	66.22	8.42
Battleship and cruiser force:				
Scouting Fleet.....	64.23	5.69	70.33	8.79
Battle Fleet.....	61.66	15.54	69.51	13.39
Asiatic Fleet.....	41.09	2.74	41.56	2.60
Destroyer squadrons:				
Scouting Fleet.....	62.16	9.01	65.57	7.54
Battle Fleet.....	68.05	4.16	74.58	5.08
Asiatic Fleet.....	85.71	7.14	82.61	8.69
Miscellaneous:				
Scouting Fleet.....	53.17	7.94	61.95	6.49
Battle Fleet.....	59.59	11.11	64.98	9.28
Asiatic Fleet.....	50.00	25.00	63.49	3.17

	Per cent, Apr. 1 to May 5, 1923.		Per cent since Jan. 1, 1923.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States.....	74.85	12.27	74.37	14.52
First naval district.....	78.57	0	83.60	4.92
Third naval district.....	87.50	12.50	72.73	15.90
Fourth naval district.....	70.37	11.11	79.45	6.85
Fifth naval district.....	69.64	10.71	66.04	18.49
Sixth naval district.....	60.00	20.00	64.29	25.00
Seventh naval district.....	100.00	0	100.00	0
Eighth naval district.....	90.90	9.09	82.76	6.90
Ninth naval district.....	66.67	33.33	90.00	10.00
Eleventh naval district.....	66.67	33.33	83.33	16.67
Twelfth naval district.....	80.65	16.13	81.20	14.52
Thirteenth naval district.....	75.00	25.00	82.35	17.65

TABLE NO. 4.—Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the five-week period April 1, 1923, to May 5, 1923, inclusive.

Class.	Navy (strength, 95,073).		Marine Corps (strength, 20,360).		Total (strength, 115,433).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood.....	1	0.11	0	0	1	0.09
Diseases of circulatory system.....	52	5.69	7	3.58	59	5.32
Diseases of digestive system.....	662	72.41	126	64.36	788	70.99
Diseases of ductless glands and spleen.....	3	.33	2	1.02	5	.45
Diseases of ear.....	125	13.67	12	6.13	137	12.34
Diseases of eye and adnexa.....	74	8.09	26	13.28	100	9.01
Diseases of genito-urinary system (non-venereal).....	174	19.03	23	11.75	197	17.75
Communicable diseases transmissible by oral and nasal discharges.....	774	84.66	129	65.89	903	81.35
Communicable diseases transmissible by intestinal discharges.....	2	.22	1	.51	3	.27
Communicable diseases transmissible by insects and other arthropods.....	74	8.09	59	30.14	133	11.98
Tuberculosis (all forms).....	29	3.17	3	1.53	32	2.88
Venereal diseases.....	1,316	143.94	242	123.61	1,558	140.36
Other diseases of infective type.....	277	30.30	75	38.31	352	31.71
Diseases of lymphatic system.....	59	6.45	9	4.60	68	6.13
Diseases of mind.....	54	5.91	19	9.71	73	6.58
Diseases of motor system.....	114	12.47	21	10.73	135	12.16
Diseases of nervous system.....	59	6.45	11	5.62	70	6.31
Diseases of respiratory system.....	1,579	172.71	172	87.86	1,751	157.75
Diseases of skin, hair, and nails.....	102	11.16	24	12.26	126	11.35
Hernia.....	48	5.25	5	2.55	53	4.77
Miscellaneous diseases and conditions.....	137	14.99	17	8.68	154	13.87
Parasites (fungi and certain animal parasites).....	97	10.61	17	8.68	114	10.27
Tumors.....	21	2.30	5	2.55	26	2.34
Diseases of women.....	0	0	0	0	0	0
Injuries.....	594	64.97	110	56.19	704	63.42
Poisons.....	38	4.16	19	9.71	57	5.14
Total.....	6,465	707.14	1,134	579.25	7,599	684.59

TABLE No. 5.—Deaths reported, entire Navy, for the five-week period April 1, 1923, to May 5, 1923, inclusive.

Cause.	Navy (strength, 95,073).	Marine Corps (strength, 20,360).	Total (strength, 115,433).
Meningitis, cerebrospinal	1	0	1
Measles	2	0	2
Pneumonia broncho	1	1	2
Pneumonia lobar	3	0	3
Tuberculosis, chronic pulmonary	3	0	3
Tuberculosis, other forms	1	0	1
Syphilis	1	0	1
Other diseases	8	2	10
Drowning	9	3	12
Other injuries	18	2	20
Poisons	1	0	1
Total	48	8	56
Annual death rate per 1,000, all causes	5.25	4.09	5.04
Annual death rate per 1,000, diseases only	2.19	1.53	2.07

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